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PART 2

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ADMINISTRATIVE

STANFORD  
FELLOWSHIP PROGRAM

Administrative Center  
John F. Kennedy Center  
Smithsonian Institution

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# **NASA-ASEE Summer Faculty Fellowship Program**

**NASA AMES RESEARCH CENTER  
DRYDEN FLIGHT RESEARCH CENTER  
STANFORD UNIVERSITY**

## **1996 Administrative Report**

### **1. INTRODUCTION**

This report presents the essential features and highlights of the 1996 Summer Faculty Fellowship Program at Ames Research Center and Dryden Flight Research Center in a comprehensive and concise form. Summary reports describing the fellows' technical accomplishments are enclosed in the attached technical report. The proposal for the 1997 NASA-ASEE-Stanford Summer Faculty Fellowship Program is being submitted under separate cover.

Of the 32 participating fellows, 27 were at Ames and 5 were at Dryden. The Program's central feature is the active participation by each fellow in one of the key technical activities currently under way at either the NASA Ames Research Center or the NASA Dryden Flight Research Center. The research topic is carefully chosen in advance to satisfy the criteria of (1) importance to NASA, (2) high technical level, and (3) a good match to the interests, ability, and experience of the fellow, with the implied possibility of NASA-supported follow-on work at the fellow's home institution.

Other features of the Summer Faculty Fellowship Program include participation by the fellows in workshops and seminars at Stanford, the Ames Research Center, and other off-site locations. These enrichment programs take place either directly or remotely, via the Stanford Center for Professional Development, and also involve specific interactions between fellows and Stanford faculty on technical and other academic subjects.

A few, brief remarks are in order to summarize the fellows' opinions of the summer program. It is noteworthy that 94% of the fellows gave the NASA-Ames/Dryden-Stanford program an "excellent" rating. Also, 94% would recommend the program to their colleagues as an effective means of furthering their professional development as teachers and researchers. Last, but not least, 84% of the fellows stated that a continuing research relationship with their NASA colleagues' organization probably would be maintained. Therefore, the NASA-ASEE-Ames/Dryden-Stanford Program has met its goals very well and every effort will be made to continue to do so in the future.

Principal Administrative Personnel for the 1996 Program were:

Consulting Professor Michael Tauber, Stanford Co-Director  
Ms. Sylvia Stanley, NASA-Ames Co-Director

Ms. Meredith Moore, NASA-Ames Administrator  
Mr. Don Black, Dryden Flight Research Center Administrator  
Ms. Melinda Francis, Stanford University Administrator

## 2. SELECTED STATISTICAL INFORMATION

| <u>Applicants</u>  |    |
|--|----|
| Number of applications (for first year fellowships)<br>received by February 1, 1996: |    |
| 1st Choice   | 35 |
| 2nd Choice   | 13 |

| <u>Participants</u>             |      |
|---------------------------------|------|
| Total Participants              | 32   |
| First Year Fellows              | 18   |
| Second Year Fellows             | 14   |
| Male                            | 27   |
| Female                          | 5    |
| Minority Males                  | 6    |
| Minority Females                | 0    |
| H.B.C.U.                        | 1    |
| Average Age (at end of program) | 46.4 |

| <u>Degree Distribution</u>  |    |
|-----------------------------|----|
| Ph.D.                       | 31 |
| Master's (Completing Ph.D.) | 1  |

| <u>Academic Rank</u> |    |
|----------------------|----|
| Professor            | 12 |
| Associate Professor  | 10 |
| Assistant Professor  | 9  |
| Instructor/Lecturer  | 1  |

| <u>Geographic Distribution</u> |    |
|--------------------------------|----|
| States Represented             | 22 |
| Universities Represented       | 32 |

## 3. HIGHLIGHTS OF THE 1996 PROGRAM:

### TOPICS RESEARCHED AND REPORTED BY THE FELLOWS

| <u>Faculty Fellow &amp;<br/>(NASA Colleague/Divison)</u> | <u>University Affiliation</u>  | <u>Title of<br/>Research Project</u>                                      |
|--|--|---|
| Asst. Prof. Michael Babich (2)<br>(Emily Holton/SL)      | Dept. of Biomedical Sciences<br>Univ. of Illinois College of<br>Medicine | Mechanisms of Bone<br>Mineralization and Effects of<br>Mechanical Loading |

|  |   |  |
|--|---|--|
| Asst. Prof. Jorge Ballester (1)<br>(Alexander Thielens/SST)        | Dept. of Physics<br>Emporia State University  | Recombination Rates of<br>Electrons with Interstellar<br>PAH Molecules   |
| Assoc. Prof. Ronald J. Bieniek (2)<br>(S. Sharma & T. Edwards/STA) | Dept. of Physics<br>University of Missouri-Rolla  | Semiquantal Modeling of<br>Molecular Energy Transfer<br>in Shocked Environments  |
| Professor Daniel Biezad (1)<br>(Lee Duke/XR)                       | Dept. of Aeronautical Engineering<br>California Polytechnic State<br>University, San Luis Obispo                    | WEBPRESS: An Internet<br>Outreach from NASA<br>Dryden  |
| Asst. Prof. Gregory A. Blaisdell (2)<br>(Karim Shariff/ADT)        | School of Aeronautics and<br>Astronautics<br>Purdue University  | Simulation and Modeling of<br>the Elliptic Streamline Flow   |
| Asst. Prof. Wanda L. Boda (1)<br>(Alan Hargins/SLR)                | Dept. of Kinesiology<br>California State University,<br>Sonoma  | A Comparison of the<br>Physiology and Mechanics<br>of Exercise in LBNP and<br>Upright Gait   |
| Dr. Stephen C. Brawley (2)<br>(Daniel Bencze/AAH)                  | Dept. of Aeronautics and<br>Astronautics<br>Naval Postgraduate School   | Aerodynamic Optimization<br>of the High Speed Civil<br>Transport   |
| Professor Delano P. Chong (2)<br>(Charles Bauschlicher/ST)         | Dept. of Chemistry<br>University of British Columbia  | Use of Density Functional<br>Method to Study Molecular<br>Vibrations   |
| Asst. Prof. Debora A. Compton (1)<br>(David Driver/ADT)            | Dept. of Aerospace and<br>Mechanical Engineering<br>Boston University   | Flow Field Measurements<br>in a 3-D Separating Flow  |
| Asst. Prof. John C. Crepeau (1)<br>(Murray Tobak/ADF)              | Dept. of Mechanical Engineering<br>University of Idaho  | The Center Manifold in<br>Fluid Transition   |
| Asst. Prof. James M. Donohue (1)<br>(Douglas Fletcher/STA)         | Dept. of Mechanical Engineering<br>Santa Clara University   | Emission Spectral<br>Measurements in the<br>Plenum of an Arc Jet Wind<br>Tunnel  |
| Assoc. Prof. Daniel L. Ewert (2)<br>(James Connolly/SLE)           | Dept. of Electrical Engineering<br>North Dakota State University  | Development of Minimally-<br>Aortic Pressure and Flow<br>Instrumentation   |
| Professor Barry D. Ganapol (1)<br>(David Peterson/SGE)             | Depts. of Hydrology & Water<br>Resources and Aerospace<br>& Mechanical Engineering<br>University of Arizona, Tucson | A Within-Leaf Radiative<br>Transfer Model with<br>Anisotropic Scattering   |
| Assoc. Prof. Amitabha Ghosh (2)<br>(Patti Schumacher/AOW)          | Dept. of Mechanical Engineering<br>Rochester Institute of Technology  | Development of a Driver<br>Code for the WICS Project   |
| Assoc. Prof. M. Susan Hallbeck (2)<br>(Bruce Webbon/STE)           | Dept. of Industrial & Management<br>Systems Engineering<br>University of Nebraska, Lincoln                          | Effects of Gloves,<br>Temperature and their<br>Interaction on Finger, Hand,<br>and arm Blood Flow & Skin<br>Temperature: A Pilot Study |

|  |  |   |
|--|--|---|
| Professor Catherine G.R. Jackson (1)<br>(John Greenleaf/SLR) | School of Kinesiology and<br>Physical Education<br>University of Northern Colorado   | Effect of +Gz Acceleration<br>on the Oxygen Uptake-<br>Exercise Load Relationship<br>During Lower Extremity<br>Ergometer Exercise   |
| Assoc Prof. Barbara Johnson-Wint (1)<br>(Emily Holton/SL)    | Dept. of Biological Sciences<br>Northern Illinois University                         | Collagen Gel Contraction<br>by Fibroblasts: The Role<br>of Myosin II and Gravity<br>Effects   |
| Professor Fazal B. Kauser (1)<br>(Bill Burcham/XRP)          | Dept. of Aerospace Engineering<br>California State Polytechnic<br>University, Pomona | Performance of Soviet<br>NK-321, Mixed Stream,<br>Triple Spool, Augmented<br>Turbofan Engine  |
| Professor David Manor (2)<br>(Robert Curry/XRA)              | Dept. of Aerospace Engineering<br>Parks College of St. Louis<br>University           | Further Study of 'Pop-Up'<br>Vortex Generators  |
| Asst. Prof. Mark S. Marley (1)<br>(Christopher McKay/SST)    | Dept. of Astronomy<br>New Mexico State University                                    | Atmosphere Models for the<br>Brown Dwarf Gliese 229B<br>and the Extrasolar Giant<br>Planets   |
| Assoc. Prof. Richard H. Miller (1)<br>(Bruce Smith/SST)      | Dept. of Astronomy and<br>Astrophysics<br>University of Chicago                      | Dynamics of Nuclear<br>Regions of Galaxies  |
| Assoc. Prof. Robert A. Morris (2)<br>(Keith Swanson/IC)      | Dept. of Computer Science<br>Florida Institute of Technology                         | A System for Automatically<br>Generating Scheduling<br>Heuristics   |
| Assoc. Prof. Ronald E. Nelson (1)<br>(Martin Brenner/XRDV)   | Dept. of Engineering<br>Arkansas Tech University                                     | Use of the Matching Pursuit<br>Algorithms for Flight Flutter<br>Test Data Analysis  |
| Assoc. Prof. Thomas Nygren (2)<br>(Judith Orasanu/AFO)       | Dept. of Psychology<br>Ohio State University   | The Role of Risk in Pilots'<br>Perceptions of Problem<br>Situations   |
| Asst. Prof. Stephen M. Ruffin (1)<br>(Grant Palmer/STA)      | School of Aerospace Engineering<br>Georgia Institute of Technology                   | Supersonic Channel<br>Concept for Enhancement<br>of Lift/Drag Ratio   |
| Professor Ravi P. Sinha (1)<br>(James Brass/SGE)             | Dept. of Geosciences<br>Elizabeth City State University                              | 1) Curriculum Development<br>in Remote Sensing at<br>California State University,<br>Monterey 2) Deforestation<br>and Biogenic Trace Gas<br>Emissions from Brazilian<br>Cerrado |
| Assoc. Prof. Bradley M. Stone (2)<br>(Louis Allamandola/SSA) | Dept. of Chemistry<br>California State University,<br>San Jose                       | Absorption Spectroscopy of<br>Polycyclic Aromatic<br>Hydrocarbons Under<br>Interstellar Conditions  |
| Professor Paul P. Szydluk (1)<br>(Theodore Bunch/SSX)        | Dept. of Physics<br>State University of New York<br>at Plattsburgh                   | Interplanetary & Interstellar<br>Dust Particles: Reentry<br>Heating and Capture in<br>Aerogel   |

|  |  |  |
|--|--|--|
| Professor Richard H. Tipping (1)<br>(Charles Chackerian/SGP) | Dept. of Physics<br>University of Alabama                                      | Line Coupling in<br>Atmospheric Spectra  |
| Professor H. William Wilson (2)<br>(Max Lowenstein/SGG)      | Dept. of Chemistry and<br>Scientific Services<br>Western Washington University | Tunable Diode Laser<br>Spectrometers and the<br>Stratospheric Ozone-<br>Nitrous Oxide Connection     |
| Professor Ira Wolinsky (2)<br>(Sara Arnaud/SLR)              | Dept. of Human Development<br>University of Houston                            | Calcium Balance in Mature<br>Rats Exposed to a Space<br>Flight Model                                 |
| Professor Hsien-Yang Yeh (1)<br>(Lance Richards/XRS)         | Dept. of Mechanical Engineering<br>California State University, Long<br>Beach  | The Yeh-Stratton Criterion<br>for Stress Concentration on<br>Fiber-Reinforced<br>Composite Materials |

**SPECIAL COURSE AT STANFORD UNIVERSITY  
DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS**

**AA298S** Seminar on New Science and Technology in the Aerospace Age, 1 unit, Prof. M. Tauber and Visiting Lecturers, held at Stanford University. (See Appendix 2 for listing of program.)

**SEMINARS AND WORKSHOPS  
(Appendices 2 - 3)**

The AA298S course took the form of widely-publicized evening meetings at Stanford attended not only by the fellows and their families, but also by the Stanford student registrants in the course as well as by interested members of the local community. Average attendance at these meetings was estimated at over 100 persons. The seminar was also broadcast over the Stanford Instructional Television Network and was thus viewed by students in the off-campus TV classrooms at major local industries such as Lockheed Martin Corporation.

Serving as the seminar chairman, Professor Tauber, introduced the speakers and moderated the discussion and questions from the audience following each presentation. It is worth noting that the well-attended seminars stimulated many favorable comments from persons both from within and outside of the fellowship program. Such response, together with publicity in the local press, constituted favorable "P.R." not only for the program but for NASA and ASEE in general. In accordance with a requested evaluation, the following are samples of the overwhelmingly favorable comments from this year's program:

*"Great series, this is the third year I've attended. I wish it were longer or was offered year round."*

*"The two talks I heard were excellent -- especially the philosophical aspects and the good mix of technical levels for the range of capabilities."*

*"It's neat to hear well-educated people talk about issues they care about. It's also uncanny how the Mars talk preceded the media's seizure of the subject by a full month! I look forward to next year; even more technical content could be fun, since it comes from nowhere else these days"*

*"Good range of subjects and outstanding speakers. One of the best series that I have heard. It was both informative and enjoyable."*

*"Excellent series of general interest. Just right for the interested educated layman."*

*"The venue is great, multi-media with very knowledgeable speakers. The main attraction for me, is the topics are current and reflect the newest issues and design considerations in the aeronautics and astronautics field."*

*"Good series of lectures. The boys from McDonnell-Douglas were particularly good, as was Dr. Cohen's discussion of GPS. The final lecture was a nice wrap up because it touched on societal issues as well as "hard science." A bit of perspective is always good. Thanks for a series of stimulating Thursday nights."*

A second seminar series was keyed more closely to current NASA-Ames programs (see Appendix 3). Each talk was presented by a selected Ames research leader who discussed his/her program in suitable depth. This weekly seminar was held at Ames during the lunch hour, to minimize the fellows' loss of research time. Thus, the participants were given a spectrum of some of the principal areas of R&D and related flight programs currently being emphasized at Ames Research Center. In conjunction with this seminar series, a comprehensive tour of Ames was arranged which included the five Dryden fellows. In addition, nineteen Ames fellows took the opportunity to travel via NASA shuttle to Dryden Flight Research Center to tour this unique research site.

#### **WORKSHOP RETREAT AT THE ASILOMAR CONFERENCE CENTER** (Appendix 4)

This was the twelfth year of the very successful "kick-off" workshop/retreat for the program. The two day meeting took place at the state-run Asilomar Conference Center in Pacific Grove (see program attached as Appendix 4). The workshop was designed to be somewhat informal, resulting in ample opportunity for interaction between speakers and fellows. As always, topics chosen were those of special interest to NASA and of importance to the NASA-university relationship. In addition, extended time was allowed for discussion and introduction of alternate thoughts and ideas, as befits a retreat.

As the past meetings have shown, an important feature of the initial workshop-retreat is the opportunity for everyone to become acquainted and for an "esprit de corps" to be established. The first full day was devoted to presentations by NASA-Ames and Stanford researchers on aeronautics and space exploration related topics. The second day of the program consisted of the research topic reviews of six of the second-year fellows. These brief presentations by the returning fellows were made in response to suggestions and requests by previous participants to learn more about the second year fellows' research topics earlier in the program.

The workshop/retreat experience generated an enthusiastic momentum among the fellows and contributed to the high morale and camaraderie which carried through the entire summer program. It should be mentioned that the workshop/retreat was run within tight economic limits in that the fellows paid the costs for their spouses and/or children who were in attendance. The co-directors continue to be fully convinced that the workshop/retreat produces a substantial payoff in terms of the value to the fellows and NASA because it enhances performance in their summer program.

### **PARTICIPATION OF DRYDEN FELLOWS**

Due to the physical distance, fellows at Dryden cannot fully participate in several of the regular activities at Ames Research Center and Stanford. Thus for them, the program is more fully centered on their specific summer R&D project. However, they do participate in major technical activities such as the workshop/retreat and the research reviews, and also attend the closing luncheon banquet of the program. In an on-going effort to increase the involvement of the Dryden Flight Research Center with the summer program, a special tour of the Ames center was arranged to include the Dryden fellows during the first week of the program. Due to the the positive feedback from the fellows about the tour, an Ames tour has been made a regular program feature for the Dryden participants. The tours of Dryden by Ames fellows were once again well received by the numerous fellows who took advantage of the opportunity to visit this unique center.

## **4. RESULTS AND ASSESSMENT OF THE TECHNICAL PROGRAM**

### **RESEARCH REVIEWS (Appendix 5)**

Communication of technical progress and results took place at a two-day Research Review meeting held at the end of the ninth week of the program. The meeting took the form of a series of 20-minute presentations by the fellows comparable in format to those given at technical society meetings. (See Appendix 5.) Participants included all fellows, NASA colleagues and other interested NASA personnel. These reviews served as the technical core of the interactive part of the program. Participation by the NASA personnel was especially valuable because more perspective was provided on the various subjects. The lively discussions following the talks provided a greater depth of understanding and pinpointed important problems needing further study. In particular, the discussion among fellows and NASA colleagues with widely different specialties helped to reveal the interdisciplinary features of the component sciences and technologies as is required for the optimum performance of aerospace systems.

Each faculty fellow supplements his/her presentation with a brief written summary report that is 3-4 pages long. It is expected that in many cases the contributions of the fellows will form parts of NASA reports and also be written up for publication in the archival literature. The summary reports have been submitted in the attached Technical Report. Although specific comments on the technical details are not warranted in this Administrative Report, some overall comments about the technical effort are appropriate.

## OVERVIEW OF THE ACCOMPLISHMENTS

As always, the subject coverage was wide indeed, including many branches of engineering and natural sciences in their most modern aspects and applications. In the great majority of instances, both the quantity and quality of the accomplishments were first-class. Many of the research review talks compared favorably with better presentations at most technical society meetings. This fine performance level stems not only from the high intrinsic capability of the fellows (as chosen by the selection process) but also reflects the value of the collaboration with NASA colleagues, who were selected from among the most active and creative R&D technical staff members. (NASA-Ames and NASA-Dryden are fortunate in having such persons.) In our opinion, the accomplishments of the fellows were substantial, especially in view of the limited time of the program -- a conclusion supported by Ames and Dryden technical management.

In retrospect, this program is very fruitful in that it is beneficial both to the fellows and to the Ames and Dryden Centers. As we understand it, the centers are still operating under at least a partial employment "freeze"; thus, the faculty fellow program helps to alleviate somewhat the shortage of highly qualified personnel. In several cases, the fellows are able to look at new problems at the "cutting edge" of the subject, thus helping to crystallize ideas for future mainline research and development. At the same time, NASA is automatically establishing a potentially fruitful university faculty contact pool for future collaboration.

It should be emphasized again that the most essential success-determining factor relates to the *quality* of the fellows' contributions. This was judged in a day-to-day manner by the NASA colleagues. The co-directors and others were able to assess the worth of the contributions from the research review presentations, informal discussions with fellows and colleagues, and the technical write-ups. This year, again, it was clear that the work was of excellent quality, and there is every reason to expect that some of the programs will have a significant impact on the American science and technology scene. A few examples of the impressive efforts and breadths of subjects were those of MICHAEL BABICH on "Mechanisms of Bone Mineralization and Effects of Mechanical Loading"; DEBORA COMPTON on "Flow Field Measurements in a 3-D Separating Flow"; DAN EWERT on "Development of Minimally-Aortic Pressure and Flow Instrumentation"; ROBERT MORRIS on "A System for Automatically Generating Scheduling Heuristics"; and RICHARD TIPPING on "Line Coupling in Atmospheric Spectra".

Further remarks relative to the assessment are presented in the next section under responses of the NASA colleagues. The positive assessment of the 1996 workshop/retreat was already given in the last section under part 3 above.

In response to repeated requests over the years from both fellows and colleagues, stipends were awarded to two graduate students this year. The (50%) student stipends were paid for with funds that remained from the 1995 program as a result of a faculty fellow withdrawing from the program at the last minute. The selection of graduate students was limited to those working with second year fellows and done on a competitive basis. The two students chosen were Joshua McBee and Eric Villeda, who came with Professors William Wilson and Thomas Nygren, respectively. Both students made significant technical contributions and benefited from their participation in the program. It would be desirable to continue to have a few graduate students participate in the program. Naturally, this is predicated on the availability of funds.

## **5. EVALUATION BY FELLOWS AND NASA COLLEAGUES**

The fellows were asked to submit responses to a questionnaire prepared by the ASEE, and the colleagues completed another questionnaire prepared by the program staff. Even though the questionnaires may be well-designed, the responses are not always complete. Frank comments were solicited, however, and the responses have been most useful to the co-directors in assessing the program and in pinpointing problems.

### **From the Fellows: Overall Assessment (Appendix 6)**

Responses have been received from all fellows and evaluated. Line C.11 in the questionnaire asks for an overall evaluation of the program. All but two fellows rated the program as "Excellent." (Of the two fellows who gave the program a "Fair" rating, one had a major personality and research goal conflict with his colleague(s) at Dryden. Among other factors, it appears that this fellow viewed the program primarily as a means of continuing his own university research. The second fellow apparently down-graded the program because the (very complex) test facility in which he was scheduled to perform diagnostic measurements was shut-down most of the summer with mechanical problems. This caused him major frustration, as he explained subsequently (Appendix 7 is a note by Prof. Dohohue), but the problem was completely beyond the influence of the program's staff.) In answer to Question B.2, 94% of the fellows said they would recommend the program "Positively" to their faculty colleagues.

Since it has been our experience that the fellows are quite frank in expressing their opinions of the programs, the response shown above is surely encouraging. The positive response indicated by almost all of this year's fellows is also characteristic of the favorable attitudes of the fellows in previous years. The written responses were supplemented by many very positive comments, both verbal and written, from the fellows to the program staff. At the same time some problem areas are recognized, and the fellows have made suggestions for improvements, as discussed in Section II below.

### **From the Fellows: Problems and Suggestions for Improvement**

By now, many of the suggestions are not new, but we continue to pay special attention to the ones that persist, but are not easily implemented. This year, the most common suggestions were the following:

- (i) Lack of affordable housing in the Bay Area.
- (ii) Improve/streamline the picture badging process.
- (iii) Modification of some of the seminars to include more discussion of the research being performed by fellows.
- (iv) Further funding for follow-up work at home institution is highly desirable.

- (v) Arrange for at least a limited number of second year fellows to bring a graduate student to participate in the research.

Item (i) is an unfortunate reality of the San Francisco Bay Area and does result in a fair amount of "sticker shock" on the part of the fellows. In addition to campus housing, this year we had the opportunity to place several of the fellows in low cost, temporary military housing at Moffett Field. Unfortunately, with military base shut downs in Northern California this housing was in high demand for military reserve programs. Our program participants had such a low priority that this became a difficult option for those who tried to utilize it and we do not expect to pursue it again next year. Item (ii) actually represents an improvement over a common complaint of our previous fellows -- lack of keys and after hour access to the center. This year we were again able to issue picture badges, and therefore keys. Despite an Ames badging office policy against issuing picture badges for less than 90 day visits, we were able to receive a special "exemption" for our faculty fellows through the persistence and diligence of Meredith Moore, our program's Ames Administrator. Item (iii) has come up previously. Again this year we had six of the second year fellows present their research reviews early in the summer at the Asilomar workshop. We will continue to facilitate new opportunities for the fellows to interact about their research efforts. Item (iv), is an old story which needs basic involvement on the part of the NASA colleague's branch, but is difficult to do in the current, tight budget situation. However, the fact that over 80% of the fellows stated that they expect to maintain a research relationship with their colleagues (line A.3) is encouraging. Item (v) is probably our most recurring comment, and resulted in the inclusion of two graduate students, as previously discussed. However, to include students in the program will require additional funding and assistance from NASA headquarters. It was interesting to note that there were less complaints about the stipend than might be expected, although many fellows felt that about a 20% increase would be warranted in this high-cost-of-living area.

The fellows praised the workshop/retreat at Asilomar, and enjoyed other scheduled social activities which included: A hosted tasting of California wines during one of our evenings at Asilomar, a picnic and concert in Stanford's Frost Amphitheater, a private tour of the Stanford Linear Accelerator Research Center, and an end of summer luncheon at a local restaurant. (Those activities that required a fee were paid for by the participants, not the program). Overall, the evaluations were very positive; the completed questionnaires are enclosed in this report as Appendix 6.

### **From the NASA Colleagues: Principal Remarks**

The attempts to involve the NASA colleagues more fully in the Summer Faculty Fellowship Program have to be assessed in light of the otherwise full-time responsibilities of these very active research leaders. Nevertheless, over the past few years, further contact between the co-directors and NASA colleagues has resulted in an increased participation by the latter. This is evident by their more active attendance and discussions at workshops, seminars and social functions. Major relevant comments are, if anything, even more favorable than last year.

- (i) Present format about right.

- (ii) All of the NASA colleagues like the program and are willing to continue their association with it.
- (iii) Several colleagues expressed the desire to extend the program to include a third year.
- (iv) Establish longer term relationship with faculty fellow through grants or consortium agreements. This feature implies the need for more line-item budgeting by the centers.

Examples of the many favorable comments from the NASA colleague evaluation questionnaire (Appendix 8) are as follows:

"This program brings talented individuals into ARC, strengthening ongoing research in areas such as new ideas and techniques to solve present technical problems; a new way of looking at and examining the research topic that would not take place with present staffing; and a reality check by a noted colleague examining if the correct questions are being asked and is real progress being made."

*Jim Brass  
Ecosystem Science and Technology Branch  
Ames Research Center*

"The program is excellent. Our group has benefited from ties on two separate occasions. Both brought new skills and capabilities to the group. This has led to ongoing collaboration with San Jose State, as the need arises, and a new long-term project in our group which will be of benefit to NASA scientists, visiting researchers and students."

*Louis Allamandola  
Astrophysics Branch  
Ames Research Center*

"I think the program has led to some solid research which already is and will continue to be valuable towards accurate/correct prediction of aerodynamic flows -- worth every dollar spent."

*Karim Shariff  
Turbulence Modeling and Physics Branch  
Ames Research Center*

"Work on an area of interest to NASA is getting done that otherwise would have been delayed due to limited manpower. I think this is a good program that helps bring new ideas to NASA as well as getting additional work done."

*Charles Bauschlicher  
Space Technology Division  
Ames Research Center*

"NASA benefits mainly from the influx of fresh thinking. Since hiring is minimal or nonexistent, this benefit is enormous. A less direct benefit is derived from the education of otherwise isolated academicians about real, practical problems NASA seeks to solve."

*Douglas Fletcher  
Reacting Flow Environments Branch  
Ames Research Center*

"This association linked a young, creative academic with NASA/ARC's advanced technology development effort managed by John Hines of the Electronic Systems Branch. I think this association -- developed over the past two summers -- will continue to benefit NASA. This association has also seemed to enhance educational opportunities for Professor Ewert's graduate students during the past academic year."

*Jim Connolly  
Payloads and Facilities Engineering Branch  
Ames Research Center*

"Barry (Ganapol) has filled a major gap in our remote sensing science efforts with his outstanding analytical and modeling skills. His model will be unique and a first in the world and allow us to take a sound, theoretically based approach to interpretation of spectra. He also strongly contributed to the Spectral Signatures of Extra Solar Planets workshop held at Ames."

*David Peterson  
Ecosystem Science and Technology Branch  
Ames Research Center*

"Our branch now has a proven tool for estimating performance of advanced engines and Prof. Kauser has been exposed to several cutting-edge Dryden programs. Overall, the program continues to be very useful to NASA Dryden. This helps us get interesting and current problems into the CalPoly system."

*Frank Burcham  
Propulsion and Performance Branch  
Dryden Flight Research Center*

"This program is an excellent collaboration of academia with the government labs, i.e. NASA. Too often there is not enough interaction between the university research and NASA engineers. By requiring the faculty member to work on-site, thereby forcing cooperation, NASA gains more direct expertise while exposing the fellow to our immediate concerns. The relationship promotes enthusiasm amongst both parties."

*Martin Brenner  
Structural Dynamics Branch  
Dryden Flight Research Center*

"A major benefit of the program is the exchange of research and ideas that might not otherwise take place. I was not aware of Dr. Ruffin's drag reduction concept before the program. This concept may have significant impact on the design of re-entry spacecraft, an area of ongoing research in my branch. I feel this program is valuable and should continue."

*Grant Palmer  
Reacting Flow Environments Branch  
Ames Research Center*

"This program represents a true win-win situation. NASA benefits from the opportunity to bring in top-notch academics who can broaden our approach to research issues. The scholars take back to their universities a better appreciation of the operational needs and issues we are addressing. Only way to improve: Eliminate the 2-year limit!"

*Judith Orasanu  
Aviation Operations Branch  
Ames Research Center*

"I find the ASEE summer faculty program, which brings the University talents in needed areas to NASA's door, to be excellent. Those of us doing biomedical research are so few and spread so thin, and we are isolated from our University colleagues more than we would like. The contacts help us and our work enormously, and we have found that our knowledge of space flight physiology is often new to our University colleagues. The exchange is excellent. I don't see how the program can be improved -- I just hope it will not be the victim of another economy initiative."

*Sara Arnaud  
Gravitational Research Branch  
Ames Research Center*

"I am a strong advocate of the summer faculty program. I believe it enhances my own knowledge, abilities and enthusiasm, as well as helping the faculty associate and his institution. NASA benefits from "new blood," new ideas, community outreach and a general high level of cross fertilization."

*Max Loewenstein  
Atmospheric Chemistry & Dynamics Branch  
Ames Research Center*

It is clear that the NASA colleagues are nearly unanimously pleased and grateful for the opportunity to have these visiting faculty specialists contributing to their programs. Evidently, the colleagues are highly satisfied with the program as it is. Other suggestions for changes are individual opinions which vary among the respondents. Nevertheless, the co-directors will continue to examine all responses from colleagues and faculty fellows with the intention of further improving the program, where possible.

### **New Opportunities for Faculty Fellows Stemming from the Program**

In almost all cases, the fellows and NASA colleagues have shown a mutual interest in follow-up work. This has taken the form of proposal planning, written proposals, and/or continuation of existing grants. A large number of publications are in progress as well, although their appearance will take a little more time. The NASA colleagues of second year fellows were asked what, if any, future plans they had for follow-up with their fellows. Generally, the colleagues reported that they intend to continue their collaboration with the fellows.

NASA colleagues and fellows also anticipate submitting publications to the following journals:

*AIAA Journal  
AIAA Journal of Aircraft  
AIAA Journal of Guidance, Control and Dynamics  
AIAA Journal of Thermophysics and Heat Transfer  
Astrophysical Journal  
ICARUS  
Journal for Bone and Mineral Research  
Journal of Applied Physiology*

*Journal of Aviation Psychology*  
*Journal of Cell Biology*  
*Journal of Chemical Physics*  
*Journal of Composite Materials*  
*Journal of Fluid Mechanics*  
*Journal of Geophysical Research*  
*Journal of Near-Infrared Spectroscopy*  
*Journal of Nutrition*  
*Journal of Physical Chemistry*  
*Photogrammetric Engineering and Remote Sensing*  
*Physical Review*

and present their findings at the following major technical society meetings

AIAA Aerospace Sciences Meeting  
AIAA Conference on Structures, Structural Dynamics and Materials  
AIAA Plasmadynamics and Lasers  
American Association for Artificial Intelligence  
American Astronomical Society  
American Chemical Society  
American Geophysical Union  
American Physical Society - Division of Fluid Dynamics  
American Physical Society - Division of Planetary Sciences  
American Society for Bone and Mineral Research  
American Society for Cell Biology  
American Society of Photogrammetry  
Human Factors and Ergonomics Society  
ISSOL Meeting (France)  
International Conference on Environmental Systems  
International Geosciences and Remote Sensing Symposium  
International Symposium of Aviation Psychology  
National Science Teachers Symposium  
Orthopedic Research Society and American College of Sports Medicine  
Society for Physical Regulation in Biology and Medicine

## **6. PERSPECTIVE ON THE OVERALL OPERATIONAL LOGISTICS**

Operation of this program has many of the features of a university admissions program. For the record, we review the sequence briefly, starting from receipt of applications:

- (i) Applications analyzed and processed by Stanford and transmitted to NASA research managers for review.
- (ii) Selection made - application materials returned to Stanford.
- (iii) Notification of awards by Stanford, including relocation and travel allowances, housing information, etc.
- (iv) NASA colleagues and selected summer fellows discuss possible research projects via telephone/e-mail programs; occasionally a visit is arranged.

- (v) Ongoing planning activity by co-directors and administrators, organizing courses, seminars, workshops, arranging housing, etc.
- (vi) Orientation meeting on the first Monday morning of the program, including distribution of all announcements, including workshop agenda, seminars, social events, etc.
- (vii) Tour of Ames facilities that same week.
- (vii) Retreat-Workshop - second week.
- (ix) Course/seminar programs (see details earlier in this report.)
- (x) Two-Day session of Research Reviews.
- (xi) Dryden fellows come to Ames for Research Reviews and to attend a group luncheon during the second week in August. Certificates of completion are given to all fellows.
- (xii) Submission of completed evaluation questionnaires by fellows and by NASA colleagues to program staff.
- (xiii) Submission of Abstract/Summary Reports by fellows to program staff .
- (xiv) Writing, compilation and submission of Final Technical Report to NASA Headquarters and the ASEE.
- (xv) Writing and submission of proposal for following year's program to NASA Headquarters and the ASEE.
- (xvi) Assessment by co-directors of the program just completed; preparation and submission of Final Administrative Report to NASA Headquarters and the ASEE.
- (xvii) Co-Directors and administrators participate in annual review and planning meeting with ASEE, NASA headquarters management and ASEE officials.

With some variation over the years, the above logistics have served the program well. The formulation is sufficiently flexible to absorb modifications and improvements in either the technical program or general arrangement.

## **7. CONCLUDING REMARKS AND RECOMMENDATIONS**

Within the context of all the considerations presented above, one feature of this program stands out. In a very positive way it serves both the interests of NASA's Ames and Dryden Research Centers and also of the faculty fellows representing a diversity of academic communities. Therefore, this program benefits a significant cross section of the higher educational scene in this country. Very directly, and at a high intellectual level, the program implements NASA's stated policy of maintaining mutually enriching

relations with the university community that also contribute to the agency's research and applications programs in a concrete manner. The Summer Faculty Fellowship Program is unique in this respect.

Also deserving emphasis is the fact that the acceptance of summer faculty fellows has grown very selective during recent years. The selection of 18 first year fellows from a strong applicant pool of 48 resulted in a very high-caliber group. Although most are at a relatively early stage of their careers, some are in mid-career and a few are already rather well known.

A continuing concern relates to the relatively small numbers of minority persons in our applicant pool. This is partly a geographical problem since there are no historically African-American colleges and very few minority colleges in California. Although the Hispanic population in California is extensive, the fraction at the college faculty level is evidently still small. A positive feature was the inclusion of one Hispanic, one African-American, one representative from an HBCU, and five women in this year's program. An active effort is continuing to recruit more minority applicants in the future.

In earlier reports, we have quoted very strong approval of the program by the past and present directors of the Ames Research Center, and at all levels of NASA management. The same is true of the Stanford University administration. It is important to note that such management support continues as strong as ever after 30 years. During that period, several modifications have improved the program's effectiveness. Within a successful overall framework, the co-directors and program staff continue to seek further improvements.

Two features which are basically important for the success of the present program, but which need careful planning on a year-to-year basis, are: (1) suitable coordination of the role of the NASA colleagues, and (2) optimizing the specialty mix among the most highly-qualified applicants, e.g., research scientists along with those who do engineering technology.

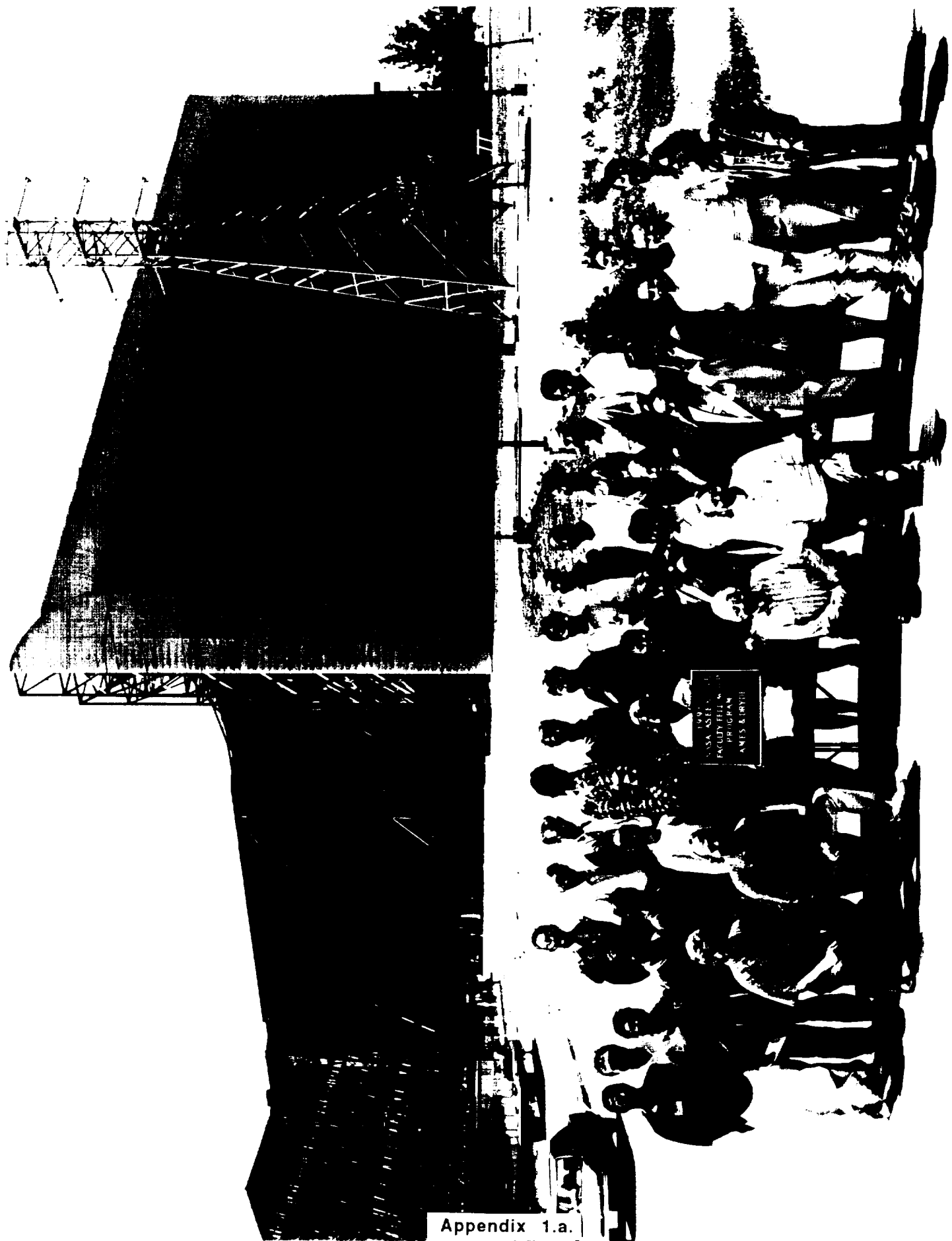
We repeat a recommendation from previous years, namely that a selected number of second-year fellows (perhaps two, or three) receive supplementary funding to bring an advanced graduate research student to participate in the summer's technical work. The positive results from such an arrangement were self-evident this summer. It would seem appropriate, if necessary, for the center in question to contribute part of this extra cost. Obviously, this is a decision that NASA management must make.

The participation of the JOVE fellows in the ASEE programs activities continues to increase each year. This year 3 of the 5 JOVE fellows attended the Asilomar workshop. JOVE fellows also took advantage of the seminars and social opportunities offered. The experience gained in previous years has provided the guidelines for a smooth collaboration between the two fellowship programs.

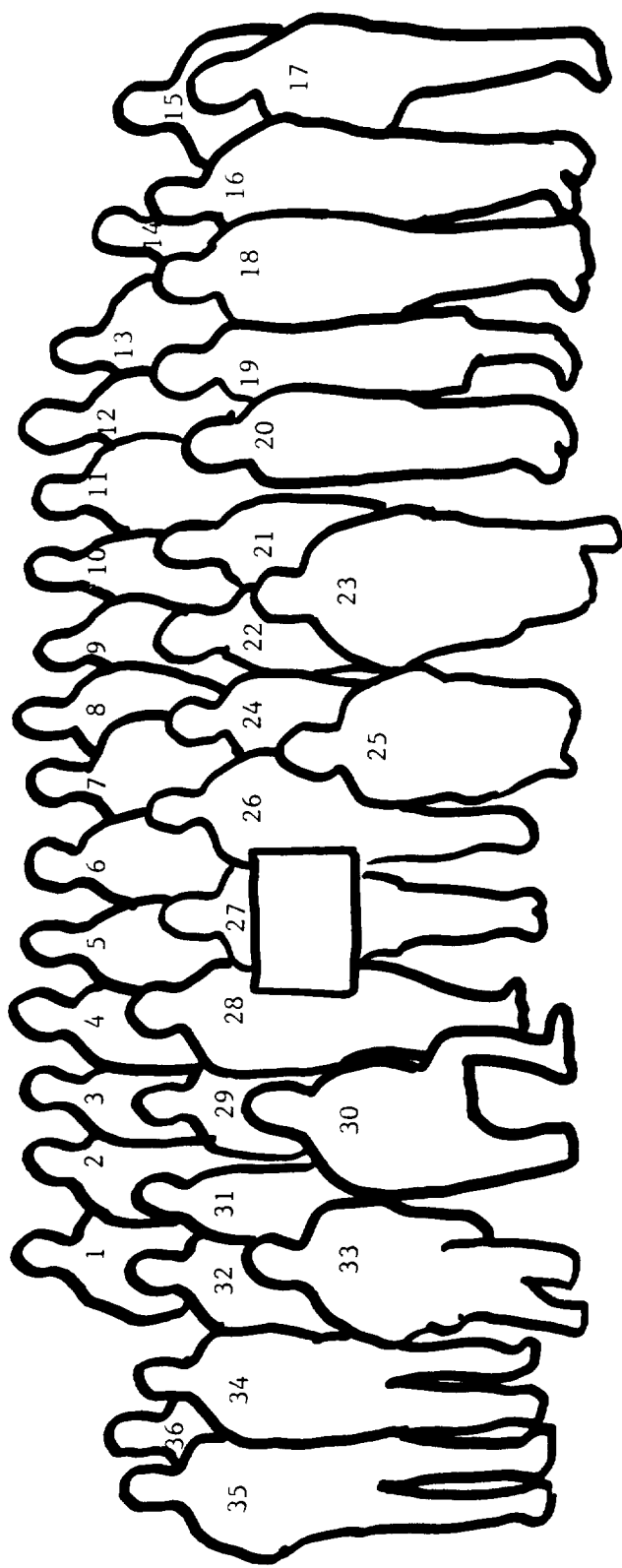
We think it is evident that the Summer Faculty Fellowship Program represents a worthwhile investment on the part of NASA. The three-way collaboration among NASA, ASEE and Stanford represents a successful arrangement. For the various reasons discussed in this report, it appears that the program deserves to be continued essentially in its present format.

## **APPENDICES**

1. Group Photographs
  - a. Group Photograph of Program Participants during Ames Tour
  - b. Key of Group Photograph during Ames Tour
  - c. Group Photograph of Participants during Asilomar Workshop
  - d. Key of Group Photograph during Asilomar Workshop
2. AA298S, Seminar on New Science and Technology in the Aerospace Age
3. Seminar on Current Research in the Aerospace Sciences
4. Asilomar Workshop-Retreat Agenda
5. Research Reviews - Schedule of Presentations
6. ASEE Evaluation Questionnaire Results
7. Letter from Professor James Donohue
8. NASA Colleague's Evaluation Form
9. Fellow's Calendar
10. Worksheet of all Fellows



Appendix 1.a.

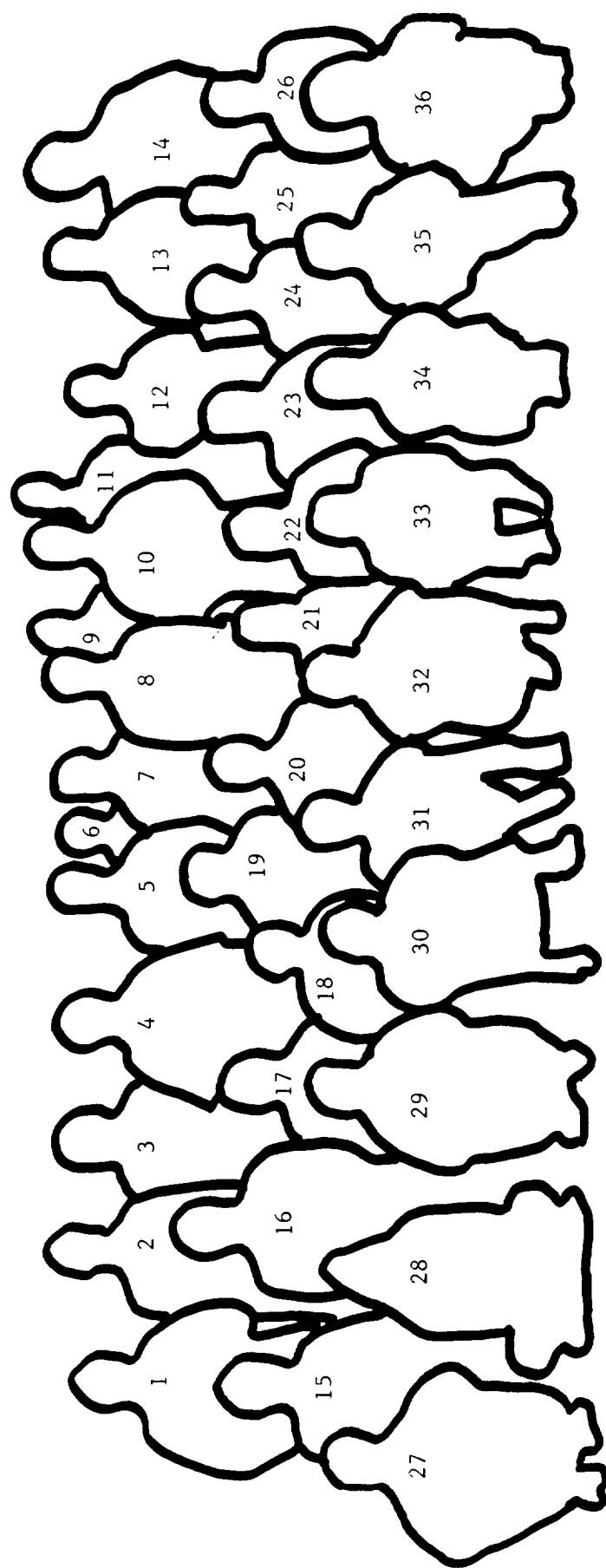


- 1) Michael Tauber, Program Co-Director
- 2) Paul Szydlak, State University of New York at Plattsburgh
- 3) Joshua McBee, Western Washington University
- 4) Robert Morris, Florida Institute of Technology
- 5) John Oloffson, University of Alaska (JOVE)
- 6) Barbara Johnson-Wint, Northern Illinois University
- 7) Hsien-Yang Yeh, California State University, Long Beach
- 8) Mike Babich, University of Illinois College of Medicine
- 9) David Manor, Parks College of St. Louis University
- 10) Daniel Ewert, North Dakota State University
- 11) Tom Nygren, Ohio State University
- 12) Jorge Ballester, Emporia State University
- 13) Don Scott, Wofford College (JOVE)
- 14) Greg Blaisdell, Purdue University
- 15) John Crepeau, University of Idaho
- 16) Mark Marley, New Mexico State University
- 17) Guest (Spouse)
- 18) Eric Villeda, Ohio State University

- 19) Meredith Moore, Ames Research Center
- 20) Fazal Kauser, Cal Poly State University, Pomona
- 21) Melinda Francis, Stanford University
- 22) Sandra Samelson, State Univ. of New York at New Paltz (JOVE)
- 23) Ronald Nelson, Arkansas Tech University
- 24) Catherine Jackson, Northern Colorado University
- 25) Ira Wolinsky, University of Houston
- 26) Shikun Karl Yeh (Student Intern - Dryden FRC)
- 27) Kristie Carlson, Dryden Flight Research Center
- 28) Daniel Biezad, Cal Poly State University, San Luis Obispo
- 29) Debora Compton, Boston University
- 30) Brad Stone, San Jose State University
- 31) Stephen Brawley, Naval Postgraduate School
- 32) James Donohue, Santa Clara University
- 33) Lee Duke (NASA Colleague - Dryden FRC)
- 34) Ravi Sinha, Elizabeth City State University
- 35) David Manor, Parks College of St. Louis University
- 36) Ron Bieniek, University of Missouri-Rolla



Appendix 1.c.



- 1) Ravi Sinha, Elizabeth City State University
- 2) David Manor, Parks College of St. Louis University
- 3) Paul Szydlak, State University of New York at Plattsburgh
- 4) Tom Nygren, Ohio State University
- 5) Joshua McBee, Western Washington University
- 6) Richard Tipping, University of Alabama
- 7) Ronald Nelson, Arkansas Tech University
- 8) Michael Tauber, Program Co-Director
- 9) John Crepeau, University of Idaho
- 10) Brad Stone, San Jose State University
- 11) Greg Blaisdell, Purdue University
- 12) James Donohue, Santa Clara University
- 13) Michael Babich, University of Illinois College of Medicine
- 14) Ira Wolinsky, University of Houston
- 15) Barbara Johnson-Wint, Northern Illinois University
- 16) Robert Morris, Florida Institute of Technology
- 17) Eric Villeda, Ohio State University
- 18) Hsien-Yang Yeh, California State University, Long Beach

- 19) Richard Miller, University of Chicago
- 20) Ron Bieniek, University of Missouri-Rolla
- 21) Stephen Ruffin, Georgia Institute of Technology
- 22) Daniel Ewert, North Dakota State University
- 23) Amitabha Ghosh, Rochester Institute of Technology
- 24) Wanda Boda, California State University, Sonoma
- 25) Debora Compton, Boston University
- 26) Melinda Francis, Stanford University
- 27) Stephen Brawley, Naval Postgraduate School
- 28) Susan Hallbeck, University of Nebraska, Lincoln
- 29) Don Scott, Wofford College (JOVE)
- 30) William Wilson, Western Washington University
- 31) Mark Marley, New Mexico State University
- 32) John Oloffson, University of Alaska (JOVE)
- 33) Fazal Kauser, Cal Poly State University, Pomona
- 34) Catherine Jackson, University of Northern Colorado
- 35) Meredith Moore, NASA Ames Research Center
- 36) Sandra Samelson, State Univ. of New York at New Paltz (JOVE)

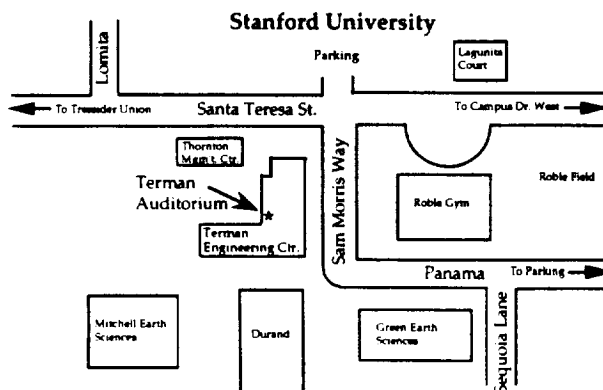
# NASA-ASEE-Stanford Seminars New Science and Technology in the Aerospace Age

Presented In Memory of  
Professor Daniel Bershader, 1923-1995

Summer 1996

Thursdays, 8:00 p.m. - Terman Auditorium

- 
- |          |   |
|----------|---|
| June 27  | RICHARD E. YOUNG, Galileo Probe Project Scientist;<br>Planetary Systems Branch, NASA Ames Research Center<br>"Results from the Galileo Encounter with Jupiter"  |
| July 4   | INDEPENDENCE DAY -- NO SEMINAR  |
| July 11  | MICHAEL CARR, Chief, Astrogeology Branch;<br>United States Geological Survey<br>"Water on Mars and Possible Biological Implications"  |
| July 18  | CLARK E. COHEN, Manager, GPS Precision Landing;<br>Department of Aeronautics & Astronautics, Stanford University<br>"The One-in-a-Billion Integrity Challenge: Landing Airplanes<br>by Satellite"                     |
| July 25  | MARK A. PAGE, Fellow;<br>Robert H. Liebeck, Senior Fellow; and<br>BLAINE K. RAWDEN, Manager of Configuration Design;<br>McDonnell Douglas Corporation<br>"Evolution of the Revolutionary Blended-Wing-Body Transport" |
| August 1 | DAVID COOPER, Associate Director, Computation Directorate;<br>Lawrence Livermore National Laboratory<br>"Teraflops and Exabytes -- Nuclear Weapons and Assurance"   |
| August 8 | WALTER G. VINCENTI, Professor Emeritus, Department of Aeronautics<br>& Astronautics and the Program in Science, Technology & Society;<br>Stanford University<br>"The 'Invention' of the Airplane"                     |
- 



## Public Invited To Attend

No Charge for Admission.  
Reservations not required.  
Please Note: Campus permit  
parking restrictions are not  
enforced after 5:00 p.m.

This seminar (AA298S)  
is available to Stanford  
students for one unit of  
credit (call 723-3328).

1996 NASA-ASEE Stanford  
Summer Faculty Fellowship Program

**Seminars on Current Research  
in the Aerospace Sciences**

NASA-Ames Research Center  
Bldg. 233, Room 172

Tuesdays, 12:00 Noon - 1:00 P.M.

- |                |  |
|----------------|--|
| <b>June 18</b> | <b>Dr. Robert Welch</b><br><i>Gravitational Research Branch</i><br>"Perception and Adaptation in Unusual Sensory Environments"             |
| <b>July 2</b>  | <b>Mr. Rod Bailey</b><br><i>Military Technology Branch</i><br>"X-36 Tailless Fighter Agility Research Aircraft"                            |
| <b>July 9</b>  | <b>No Seminar -- Stanford Linear Accelerator Center Tour.</b>  |
| <b>July 16</b> | <b>Dr. Jeff Scargle</b><br><i>Planetary Systems Branch</i><br>"New Results in Xray and Gamma Ray Astronomy, Black Holes and Neutron Stars" |
| <b>July 23</b> | <b>Dr. John Hines</b><br><i>Electronic Systems Branch</i><br>"Medical and Surgical Applications of Space Biosensor Technology"             |
| <b>July 30</b> | <b>Mr. Mike Green</b><br><i>Office of the Director of Space Research</i><br>"The Next Generation: The Reuseable Launch Vehicle Program"    |

**1996 NASA-ASEE Summer Faculty Fellowship Program  
at NASA-Ames Research Center and  
NASA-Dryden Flight Research Center**

**WORKSHOP RETREAT  
JUNE 23-25, 1996  
AT ASILOMAR CONFERENCE CENTER**  
800 Asilomar Blvd., Pacific Grove, California  
Telephone: (408) 372-8016

**REVISED (FINAL) AGENDA**

**Sunday, June 23rd**

|                  |  |                                  |
|------------------|--|----------------------------------|
| 3:00 - 4:15 p.m. | Registration is at the NASA-Stanford Desk.<br>For spouses and children, please make your<br>check payable to "Asilomar Conference<br>Center" and give it to Melinda Francis.<br>Meal tickets and room keys will be available<br>at the main desk for those who arrive after<br>4:15 p.m. on Sunday. A \$1.00 refundable key<br>deposit will be required. | Administration Bldg.             |
| 5:30 p.m.        | Social   | Barbeque Area                    |
| 6:00 p.m.        | Barbeque Dinner  | Barbeque Area                    |
| 8:00...          | Hospitality Room   | Guest Inn<br>East Woods/Fireside |

**Monday, June 24th**

|                    |  |                     |
|--------------------|--|---------------------|
| 7:30 a.m.          | Breakfast  | Crocker Dining Hall |
| 9:00 - 10:10 a.m.  | "Strategies for Research Institutions"<br>Dale Compton<br>Former Director, NASA Ames Research Center   | Heather             |
| 10:10 - 10:25 a.m. | Coffee Break   |                     |
| 10:25 - 11:35 a.m. | "From Einstein's Space and Time to Landing<br>on a Dime"<br>Clark Cohen<br>Manager, GPS Precision Landing<br>Department of Aeronautics & Astronautics<br>Stanford University | Heather             |
| 12:00 Noon         | Lunch  | Crocker Dining Hall |

|                  |  |                                  |
|------------------|--|----------------------------------|
| 1:20 - 2:30 p.m. | <b>"The Origins and Outcome of the Galileo Probe's Mission to Jupiter"</b><br>Alvin Seiff<br>San Jose State University Foundation and<br>Ret. Sr. Res. Assoc., NASA Ames Research Center | Heather                          |
| 2:50 - 4:00 p.m. | <b>"Research and Technology for the Galileo Entry Probe Heat Shield"</b><br>John Lundell<br>Former Associate Director of Aerophysics<br>NASA Ames Research Center                        | Heather                          |
| 2:30 - 2:50 p.m. | Coffee Break   |                                  |
| 6:00 p.m.        | Dinner   | Crocker Dining Hall              |
| 8:00 p.m.        | Wine Tasting and Hospitality Room<br>(Cost for wine tasting: \$10.00 per person)   | Guest Inn<br>East Woods/Fireside |

### **Tuesday, June 25th**

|                    |  |  |
|--------------------|--|--|
| 7:30 a.m.          | Breakfast  | Crocker Dining Hall  |
| 9:00 a.m.          | Research Reviews by Second Year Fellows                            | Heather  |
| 9:00 - 9:20 a.m.   | Robert Morris  | "Statistically Characterizing the Performance of Automated Scheduling"                   |
| 9:20 - 9:40 a.m.   | William Wilson   | "Tunable Diode Laser Spectrometers and the Stratospheric Ozone-Nitrous Oxide Connection" |
| 9:40-10:00 a.m.    | Ron Bieniek  | "Molecular Energy Transfer in Aerothermodynamics"  |
| 10:00 - 10:10 a.m. | Group Photo  |  |
| 10:10 - 10:30 a.m. | Coffee Break   |  |
| 10:30 - 10:50 a.m. | Brad Stone   | "A Search for Complex Organic Molecules in the Interstellar Medium"                      |
| 10:50 - 11:10 a.m. | Susan Hallbeck   | "Extra Vehicular Activity (EVA) Gloves"  |
| 11:10 - 11:30 a.m. | Tom Nygren   | "The Role of Risk in Pilots' Perceptions of Problem Situations"                          |
| < 12:00 Noon       | Checkout; return keys to main desk for refund of your key deposit. | Administration Bldg.   |
| 12:00 Noon         | Lunch  | Crocker Dining Hall<br>(or box lunch if ordered on Monday)                               |

**NASA-ASEE-Stanford Summer Faculty Fellowship Program  
1996 Research Reviews**

**August 8th and 9th**

**NASA-Ames Research Center  
Bldg. 233, Room 172**

Opening remarks by research colleagues, 15 minute presentation of research  
followed by a 5 minute discussion period.

**August 8th**

|                    |   |   |
|--------------------|---|---|
| 8:30 - 8:50 a.m.   | <b>Barry Ganapol</b><br>"Modeling Leaf Radiative Transfer with<br>Anisotropic Scattering"   | <i>Dave Peterson (SGE)</i>                        |
| 8:50 - 9:10 a.m.   | <b>Ravi Sinha</b><br>1.) "Curriculum Development in Remote Sensing<br>at California State University, Monterey Bay" and<br>2.) "Deforestation and Biogenic Trace Gas Emissions<br>from Brazilian Cerrado" | <i>Jim Brass (SGE)</i>                            |
| 9:10 - 9:30 a.m.   | <b>Wanda Boda</b><br>"The Biomechanics and Physiology of Exercise<br>in Lower Body Negative Pressure"   | <i>Alan Hargens (SLR)</i>                         |
| 9:30 - 9:50 a.m.   | <b>Ira Wolinsky</b><br>"Calcium Balance in Rats Exposed to a<br>Space Flight Model"   | <i>Sara Arnaud (SLR)</i>                          |
| 9:50 - 10:10 a.m.  | <b>Catherine G.R. Jackson</b><br>"Effect of +Gz Acceleration on the Oxygen<br>Uptake-Exercise Load Relationship During<br>Lower Extremity Ergometer Exercise"   | <i>John Greenleaf (SLR)</i>                       |
| 10:10 - 10:30 a.m. | <b>Dan Ewert</b><br>"Development of Minimally-Invasive Aortic<br>Pressure and Flow Instrumentation"   | <i>Jim Connolly (SLE)</i>                         |
| 10:30 - 10:45      | <b>Break</b>  |   |
| 10:45 - 11:05 a.m. | <b>Ronald Nelson</b><br>"Time-Frequency Plane Representation of<br>Signals Using Matching Pursuit"  | <i>Mary Brenner &amp; Larry Freudinger (XRDV)</i> |
| 11:05 - 11:25 a.m. | <b>David Manor</b><br>"Further Study of 'Pop-up' Vortex Generators"   | <i>Robert Curry (XRA)</i>                         |
| 11:25 - 11:45 a.m. | <b>Fazal Kauser</b><br>Performance of Soviet NK-321, Mixed Stream,<br>Triple Spool Turbofan Engine used on 'Blackjack'<br>Long Range, Strategic Bomber"   | <i>Bill Burcham (XRP)</i>                         |

|                    |   |                                  |
|--------------------|---|----------------------------------|
| 11:45 - 12:05 p.m. | <b>Daniel Biezad</b><br>"Webpress: Internet Outreach from NASA Dryden"  | <i>Lee Duke (XR)</i>             |
| 12:05 - 12:25 p.m. | <b>Hsien-Yang Yeh</b><br>"The Yeh-Stratton Criterion for Stress Concentrations on Fiber-Reinforced Composite Materials" | <i>Lance Richards (XRS)</i>      |
| 12:45 - 2:00 p.m.  | <b>Luncheon at Michael's at Shoreline</b>   |                                  |
| 2:15 - 2:35 p.m.   | <b>Mark Marley</b><br>"The Atmospheres of Extrasolar Giant Planets and Brown Dwarfs"                                    | <i>Chris McKay (SST)</i>         |
| 2:35 - 2:55 p.m.   | <b>Richard Miller</b><br>"Studying the Dynamics of Nuclear Regions in Galaxies"   | <i>Bruce Smith (SST)</i>         |
| 2:55 - 3:15 p.m.   | <b>Jorge Ballester</b><br>"Recombination Rates of Electrons with Interstellar PAH Molecules"                            | <i>Alexander Thielens (SST)</i>  |
| 3:15 - 3:35 p.m.   | <b>Paul Szydlík</b><br>"Cosmic Dust: Reentry Heating and Capture in Aerogel"  | <i>Ted Bunch (SSX)</i>           |
| 3:35 - 3:50 p.m.   | <b>Break</b>  |                                  |
| 3:50 - 4:10 p.m.   | <b>Jim Donohue</b><br>"Emission Spectra Measured in the Plenum of an Arcjet Wind Tunnel"                                | <i>Douglas Fletcher (STA)</i>    |
| 4:10 - 4:30 p.m.   | <b>Stephen Ruffin</b><br>"Supersonic Channel Concept for Enhancement of Lift/Drag Ratio and Reduction of Heat Transfer" | <i>Grant Palmer (STA)</i>        |
| 4:30 - 4:50 pm.    | <b>Delano Chong</b><br>"Use of Density Functional Method to Study Molecular Vibrations"                                 | <i>Charles Bauschlicher (ST)</i> |
| 4:50 p.m.          | <b>Adjourn</b>  |                                  |

### **Friday, August 9th**

|                  |   |                            |
|------------------|---|----------------------------|
| 9:00 - 9:20 a.m. | <b>Gregory A. Blaisdell</b><br>"Simulation and Modeling of the Elliptic Streamline Flow"  | <i>Karim Shariff (ADT)</i> |
| 9:20 - 9:40 a.m. | <b>Debora Compton</b><br>"Flow Field Measurements in a Three-Dimensional Separating Flow" | <i>David Driver (ADT)</i>  |

|                    |  |                                 |
|--------------------|--|---------------------------------|
| 9:40 - 10:00 a.m.  | <b>John Crepeau</b><br>"The Center Manifold in Fluid Transition"   | <i>Murray Tobak (ADF)</i>       |
| 10:00 - 10:20 a.m. | <b>Stephen C. Brawley</b><br>"Aerodynamic Optimization of the High Speed Civil Transport"                                  | <i>Dan Bencze (AAH)</i>         |
| 10:20 - 10:35 a.m. | <b>Break</b>   |                                 |
| 10:35 -10:55 a.m.  | <b>Amitabha Ghosh</b><br>"Development of a Driver Code for the WICS Project"   | <i>Alan Boone (AOW)</i>         |
| 10:55 - 11:15 a.m. | <b>Richard Tipping</b><br>"Line Coupling in Atmospheric Spectra"   | <i>Charles Chackerian (SGP)</i> |
| 11:15 - 11:35 a.m. | <b>Michael Babich</b><br>"Gravitational Effects on Bone Cell Cytoskeleton and Function"                                    | <i>Emily Holton (SL)</i>        |
| 11:35 - 11:55 a.m. | <b>Barbara Johnson-Wint</b><br>"Collagen Gel Contraction by Fibroblasts: The Role of the Cytoskeleton and Gravity Effects" | <i>Emily Holton (SL)</i>        |
| 11:55 a.m.         | <b>Adjourn</b>   |                                 |

American Society for Engineering Education

1996 NASA/ASEE Summer Faculty Fellowship Program  
Evaluation Questionnaire

A. PROGRAM OBJECTIVES

1. Are you thoroughly familiar with the research objectives of the research (laboratory) division you worked with this summer?

Yes            29

No             3

- No, not thoroughly, but somewhat. There are great varieties of projects within exobiology.

2. Do you feel that you were engaged in research of importance to your Center and to NASA?

Yes            31

No             1

- No, my branch disappears on October 1, 1996.

3. Is it probable that you will have a continuing research relationship with the research (laboratory) division that you worked with this summer?

Yes            27

No             1

Uncertain    4

- No, they are going away and JSC isn't ready. Uncertain, teaching time factor is a problem.

4. My research colleague and I have discussed follow-up work including preparation of a proposal to support future studies at my home institution, or at a NASA Center.

Yes            21

No             10

- No, funding for follow-up is already in hand. No new proposal needed.
- Follow-up work, yes; research proposal, no.
- Not yet.

5. Are you interested in maintaining a continuing research relationship with the research (laboratory) division that you worked with this summer?

Yes            30

No             2

## B. PERSONAL PROFESSIONAL DEVELOPMENT

1. To what extent do you think your research interests and capabilities have been affected by this summer's experience? (you may check more than one)

Reinvigorated 16  
Redirected 11  
Advanced 23  
Barely Maintained 1  
Unaffected 1

- Could be advanced later on.

2. How strongly would you recommend this program to your faculty colleagues as a favorable means of advancing their personal professional development as researchers and teachers?

Positively 31  
Not at all 1

- Depends greatly on colleague.

3. How will this experience affect your teaching in ways that will be valuable to your students? (you may check more than one)

By integrating new information into courses 32  
By starting new courses 6  
By sharing research experiences 26  
By revealing opportunities for future employment in government agencies 18  
By deepening your own grasp and enthusiasm 22  
Will affect my teaching little, if at all 2

- May possibly start a new course next year.

4. Do you have reason to believe that those in your institution who make decisions on promotion and tenure will give you credit for selection and participation in this highly competitive national program?

Yes 19  
No 8  
Don't Know 1  
N/A 4

- Yes, I know that it did. I was awarded tenure and promotion this spring.
- N/A, I am a tenured professor.
- N/A, I am already a tenured, full professor.
- Yes, I hope so.
- N/A, tenured full professor.

### C. ADMINISTRATION

1. How did you learn about the Program? (Please check appropriate response)

14 Received announcement in the mail  
3 Read about it in a professional publication.  
11 Heard about it from a colleague.  
9 Other (explain)

• Other, met fellows at Goddard in 1991. • Other, displayed on departmental billboard.  
• Other, pamphlet at AIAA Science Exhibit at Reno. • Other, was a NASA-ASEE fellow before.  
• Other, this was a continuation of my last year's work. • Other, I called Stanford.  
• Other, on NASA ASEE Committee. • Other, this is my second year on this cycle.  
• Other, I was a NASA-ASEE summer faculty at Dryden in 1987 and 1988.

2. Did you also apply to other summer faculty fellowship programs?

7 Yes      25 No  
1 DOE  
2 Another NASA Center  
1 Air Force  
3 Army  
4 Navy  
1 D.O.D.

3. Did you receive an additional offer of appointment from one or more of the above?

If so, please indicated from which. Yes 5 No 18 N/A 3

One offer each from DOE, Another NASA Center, Navy, Air Force, and the NASA JOVE Program

4. Did you develop new areas of research interest as a result of your interaction with your Center and laboratory colleagues?

Many 5  
A Few 23  
None 4

• A few, maybe more in the future.

5. Would the amount of the stipend (\$1,00 per week) be a factor in your returning as an ASEE Fellow next summer?

Yes 19  
No 10

If not, why

• Yes, if there is a significant drop I would have to reconsider. • No, the amount of the stipend is fine. • No, second year is finished. Stipend amount was adequate. • Yes, that is \$1,000

per week is barely enough. • For the cost of living in this area, \$10K is not much. This should be factored into the relocation expenses as well. • No, this is my second year. • No, the experience is what is most important! • No, it is not enough compared to expenses here. However, money was not the factor in my initial selection anyway. • Yes, it was too expensive for housing out here for what I was getting out of the program. • Yes, housing is VERY expensive and difficult to get. • No, I'm here for the use of a unique facility, the Hypergravity Facility for Cell Culture. • Yes, it is a little low compared to my current salary, thus direct research support might be greater. However, the overall opportunity is certainly valuable in and of itself. • Sufficient. • The amount is less than that awarded by the D.O.D. by about \$3,000 and the cost of living here is very high, but it's not a critical factor. In fact, I will very much like to come back to complete the project. • Second year fellow, does not apply. • No, it isn't much of a factor. I apply for the opportunity to do scientific research. There must be compensation above that required for expenses, however. • No, presently sufficient to cover expenses. • Cannot participate next summer. Stipend is inadequate in view of the high rental costs this year. Silicon Valley experiencing a boom, rentals are scarce and dear.

6. Did you receive any informal or formal instructions about submission of research proposals to continue your research at your home institution?

Yes 23 No 9

• Yes, informal – no money is available. • Yes, but the new contract people (new contract) didn't know as much as I did about the process! • Yes, Ames University Affairs Office.

7. Was the housing and programmatic information supplied prior to the start of this summer's program adequate for your needs?

Yes 30 No 2

• Yes, information provided was excellent but the housing was a perpetual problem. It was expensive and difficult to obtain. • Does not apply, I am local (live in San Jose). • Yes, but.... maybe a bit of history on housing that past fellows have used. A list of apartments that take short-term leases.

8. Was the contact with your research colleague prior to the start of the program adequate?

Yes 28 No 4

- No, I tried. • No, but there was a good reason. This is just a fact that in no way reflects on Dr. Bunch. He was out of town for several weeks at the time I received the offer and his wife was ill. Dr. Bunch has considerable administrative as well as scientific responsibilities. Despite these, he has made determined efforts to keep up with my work, its progress and problems, through e-mail as well as periodic personal meetings.

9. How do you rate the seminar program?

Excellent 23  
Good 8  
Fair 1  
Poor

10. In terms of the activities that were related to your research assignment, how would you describe them on the following scale?

| Check one per activity | Time Was |           |           |       |
|------------------------|----------|-----------|-----------|-------|
|                        | Adequate | Too Brief | Excessive | Ideal |
| Research               | 14       | 11        |           | 7     |
| Lectures               | 19       | 1         | 4         | 7     |
| Tours                  | 17       | 2         | 1         | 12    |
| Social Recreational    | 16       | 4         | 1         | 11    |
| Meetings               | 14       | 1         | 2         | 12    |

- Excessive lectures -- two per week is more than I can attend.
- Research time is always too brief by definition!
- Research is too brief for new projects.

11. What is your overall evaluation of the program?

Excellent      29  
 Fair            2  
 Poor                  

- A- shall we say?

12. If you can, please identify one or two significant steps to improve the program.

- I had problems getting a useful computer network connection. Being visitors, some of the support people prefer to ignore us. Why not? We disappear in 10 weeks.
- More current talks about recent work and funding at Asilomar conclave. Please try to arrange the grant to be given to the fellow's home institution. That is what counts. This would be difficult, but that is how the system works.
- The program is fine.
- Arrange for picture badge before our arrival. Let people who get picture badges know that it takes 2-3 days to check out when you leave.
- Yes, you could make up t-shirts or preferably sweatshirts for the NASA ASEE program members -- I'd buy one.
- Have Asilomar retreat in the middle of the program.
- I enjoyed the program very much. As I mentioned earlier, adjustments for the very high cost of living in the area (Bay Area) would be appropriate. In terms of technical work, the program was great.
- I was less interested in the "extra curricular" activities, more in the research. Very important to set-up work to be done before the summer starts.
- A competition for a grant.
- Housing! The stipend for housing is inadequate. If it were doubled it might help. Also, adding more life science colleagues and fellows would improve the engineering mix.

- More life science lectures in the seminar series.
- 1.) Once a fellow has been security cleared to work in NASA labs, it would be beneficial to both sides to release the classified information to the fellow related to his/her research topic.  
2.) The computer system(s) available in the NASA laboratories should be told to the fellow by the NASA colleague in detail at the earliest possible date.
- More 1. Socials, 2. Money, 3. Follow-up.
- I think it is very well run.
- Given the constraints, the program is probably as good as it can be. Uncertainty of its standing within NASA is a major concern -- but not something we can do much about.
- Let NASA researchers obtain more information about the program.
- An increase in stipend would help those who must maintain two households. Otherwise it is very good as it is.
- Don't put all of the research summary presentations at the end. Have more second year people give a talk earlier -- perhaps on several of the last Tuesday times.
- 1.) Significantly increase stipend and/or relocation allowances. 2.) Remove restraint against receiving other federal funding during the 10 week fellowship.
- Hard to improve on a superbly run program!
- Get rid of the oral presentations in the present form -- especially for the first year fellows. The oral presentation is the tail that is wagging the whole summer's dog. Because of this required presentation there is no flexibility in scheduling our ten-week period. An earlier period is particularly important for those of us whose "Fall" term begins in late August and who need the prep time for new courses, lab setups, etc. Since I was told that the presentations would be on Thursday, August 8, I came a week and a day early to leave the 9th for packing, etc. The presentations are actually scheduled for a day and a half -- including the morning of the 9th. I will be in a furnitureless apartment for 3 days since I want to be present for the move. Hence, the furniture goes on the 7th. As for the purpose of the presentations. Evaluative? I maintain that the written report and the Ames colleague's evaluation are sufficient. Informative? Pedagogic? Again, since we will see each other's written report why the oral presentation? The marathon sessions are just not effective. However interesting the presentations may be, I doubt that anyone can maintain interest for this long a period. Why not delay the presentations to the second year and distribute them a few at a session. Then there's the matter of preparation time. To prepare an effective oral presentation, not to mention a written report, takes time -- time which detracts from the research itself.
- Allow graduate students with professor.
- More follow-up to stress publications and subsequent grant proposals.
- None.

13. For second-year Fellows only. Please use this space for suggestions on improving the second year.

- Give more information on possible future visits.

- Funding for X-mas visit to discuss projects for the 2 summers.
- I feel the program is excellent as it stands.
- Have the opportunity for a 3rd year if the work was not completed in the 2nd year.
- None.
- Having a student along was excellent. This improved the summer work dramatically.
- No improvements necessary – I just hope that the program continues to get funded.
- More pressure to show results from the first year.
- It's fine. Leadership and administration of program is efficient and intelligent.

#### D. STIPEND

1. To assist us in planning for appropriate stipends in the future would you indicated your salary at your home institution.

\$54,483 per year

Average of thirty responses (all but three were per academic year)

2. Is the amount of the stipend the primary motivator to your participation in the NASA-ASEE Summer Faculty Fellowship Program?

Yes 3 No 13 In part 16

- In part, but as it turns out, the stipend did not meet expenses this summer.

3. What, in your opinion, is an adequate stipend for the ten-week program during the summer of 1997?

- \$10,000 plus relocation/travel costs that are adjusted between the different NASA centers for cost-of-living. • \$10,000 plus travel and relocation is adequate. • \$12,000 - \$14,000.
- \$12,000 plus travel and relocation. • \$10,000 plus travel and housing (i.e., as it is). • Yes and in part, but it would be impossible to participate without it. • \$1,000/month. • \$10,000.
- Use the salary based on the academic year for each fellow. For example, my salary ~50K/9 mo. works out to be \$1,290/week. I believe that DOE/AWU uses this method. • \$12,500.
- \$14,000 for senior fellows. • \$16,000 -- \$2,500 for housing out here, \$1,000 for travel (mileage), 10 weeks of \$45,000 for 9 mo. salary (average starting asst. prof. salary) equals \$1250/wk. • \$1,500/wk. • \$15,000 plus usual allowances. • \$10,500. • More would be nice, but probably not realistic. • \$14,000. • At least the same as Navy. • \$11,000.
- \$1,100 per week or increase the housing allowance. Silicon Valley is very expensive.

#### E. ASEE MEMBERSHIP INFORMATION

1. Are you currently a member of the American Society for Engineering Education?

Yes 9 No 23

2. Would you like to receive information pertaining to membership in the ASEE?

Yes    14       No    14       N/A    4

- N/A., already a member.

### PLEASE USE THE PAGE FOR YOUR COMMENTS TO ANY QUESTION

- I thought the program was excellently run by both Meredith and Melinda. They gave lots of attention to detail and I appreciate this.

- Since my branch is going away, the branch chief doesn't care about anything. I tried to discuss things before my second year and got assurances that I would have meaningful work (as did Melinda Francis and Mike Tauber); however, once I arrived, the equipment was gone and my fellow (colleague) was too. I saw him a total of 30 minutes all summer (3 occasions). I tried to get with another colleague in a related field, but he has been traveling for research 5 of the 10 weeks and introduced me to the group as "this young lady" -- no mention of title/degree or anything. It was truly disheartening -- I am tired of fighting the system -- I consider this summer a waste of my time/resources and yours. The only bright spot is the people I work with and the other faculty fellows and ASEE/Stanford/NASA staff -- they have been wonderful.

- The three primary contacts for the program, Melinda, Meredith and Mike did an outstanding job and are to be commended for all of their concern and hard work. Even when circumstances were beyond their control, such as expensive housing, they did their best to help in any way that they could.

I would also like to commend my colleague, John Greenleaf, for taking the job of mentoring seriously and for integrating me into his laboratory. We have had a very productive association through the auspices of this program. I thank you for giving me this opportunity.

- I've enjoyed immensely working with Dr. Alex Malouvier utilizing the Hypergravity Facility for Cell Culture this summer. One of the aspects of the program that I liked best was being able to bring my own research project to NASA and use a unique facility (HyFaCC) to answer fundamental questions about how cells organize collagen in response to force.

- My colleagues at Propulsion and Performance Branch at NASA Dryden were very helpful and professional. I was impressed by their dedication to the profession. This includes the support staff as well.

- 1.) For some fellows these two summers involved considerable sacrifices, e.g., distance from family/loved ones, financial loss, and the general difficulties associated with uprooting/moving. These are especially acute for the NASA DFRC fellows. I believe a more generous compensation schedule may enable a visit to/by family, which may make the experience less of a burden.

- 2.) I discovered that NASA DFRC is not as accomodating as NASA ARC and other centers both during and after the work day is completed. I think that a photo I.D. and socials will help considerably by making us a part of the team. At present we are "different" outsiders.

- I think this is an excellent program.

- Totally rewarding experience. Greatly appreciate Mike Tauber, Meredith Moore, Melinda Francis and Sukie Stanley.

Efforts should be made to urge first year fellows to set more realistic goals and ultimately achieve better and more extensive results. Some fellows had ridiculous projects which would take years of research to achieve. Their results in two years were trivial.

- I would like to commend Professor Michael Tauber, Melinda Francis and Meredith Moore for their efforts in what I perceive to be a well-organized, excellently managed program. I am grateful that Mike Tauber agreed to take over after the unfortunate demise of Dan Bershader last year. The program allowed me to get re-established in a research group at Ames, and I am confident that my collaborations with this group will continue on for years to come. I have seen many former ASEE colleagues that have continued their research at NASA -- some full time.

The organization and management of this program is an example of Stanford University living up to its reputation -- a class act!

- The housing situation was a real nightmare. The Navy housing sounded like an excellent alternative for the time when I was here by myself, but the uncertainty of not knowing from week to week if I would be able to stay there was too stressful. Also having to scramble to find a hotel room on the National Guard "drill" weekends was difficult and time consuming. I feel like I lost about 3 of the 10 weeks just making housing/office arrangements and other non-research related things. I enjoyed my work very much and learned a lot. But I was frustrated in losing time and not getting more work done.

From an administrative perspective, however, this has been the best summer program I have been associated with. Melinda and Meredith are superb.

- I would like to commend the director and administrator's of this program, Michael Tauber, Melinda Francis and Meredith Moore. Their very professional work contributed greatly to the success of this program. They often went out of their way to help us out on a personal level as well.

Also, I would like to commend my hosts at Dryden, Mertin Brenner and Larry Freudinger. They made certain that resources I needed to do my work were available, including time. They took time for discussions about my work and were always forthcoming with help, advice and suggestions. Working with people like these is a major incentive to participate in the program.

Last, the very excellent local support of Don Black's office in the person of Ms. Kristie Carlson was much appreciated.

- There appears now to be general consensus among scientists that global warming is a reality and that fossil fuels and biogenic gases are the two main anthropogenic causes for the above. While there are a number of models depicting the range of impact on our climate, a good quantitative evaluation of the emission and impact of biogenic gases on both regional and global atmospheric circulation and thence on our climate, is essential.

The research program therefore that NASA has initiated is urgent and timely and deserves full cooperation. I am pleased to be associated with the program which includes the study of fire scars in Brazil. While we know that fire scars can be studied by remote sensing, it appears that in the past several different systems have been used and recommended by various authors. A future project recommended by my NASA colleague is to study the comparative merit of the systems and make appropriate recommendation.

- The pre-offer personal contact was very good. I was particularly appreciative of a reminder from the Johnson Space Center that they had not received a letter of recommendation from my department chair. It was obviously my responsibility to follow-up (though I had reminded my chair once). Without this reminder I would never have received an offer at all! Mine was not one of the clear cut offers. Both Melinda Francis and Mike Tauber kept me current on the status of my application and offer. I appreciated that. One of my major efforts was to secure the best data on the physical properties of silica aerogel. When I mentioned this at a social event to Mike Tauber he immediately (within a couple of days) put me in contact with possible sources. All these showed an interest in us individually and in our projects.

- Continues to be one of the best organized summer programs. Tauber has done an excellent job in place of Bershader. Other support people continue the tradition.

Dr. Michael E. Tauber, Co-Director  
NASA ASEE Stanford Summer Faculty Fellowship Program  
Department of Aeronautics and Astronautics  
Stanford University  
Stanford, CA 94305-4035

Sept. 12, 1996

Dear Dr. Tauber,

I am writing to thank you and comment on my recent participation in the NASA ASEE summer faculty program at the Ames Research Center this summer. I was very happy to be chosen as a participant in the program and thought the program planning and administration was excellent. Although the program afforded me every opportunity to accomplish much this summer, circumstances with the Ames arc-jet facilities held up much of the testing that I was hoping to perform, and my expectations for summer research were less than fulfilled. Because I am situated nearby at Santa Clara University, I hope to continue working at Ames on a part time basis during the school year and to perform the testing we had planned for the summer. I realize it is difficult to complete a research project in the ten short weeks that the program lasts so I look forward to returning next summer.

Sincerely,

A handwritten signature in black ink, appearing to read 'James M. Donohue', with a long horizontal flourish extending to the right.

Dr. James M. Donohue  
Assistant Professor  
Department of Mechanical Engineering  
Santa Clara University  
Santa Clara, CA 95053

# NASA-ASEE-Stanford Summer Faculty Fellowship Program

## 1996 NASA-Colleague Evaluation

1. Name of Faculty Fellow \_\_\_\_\_
2. Your Name \_\_\_\_\_
3. Branch / Division \_\_\_\_\_
4. Indicate briefly the subject area of the fellow's research:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. What are the fellow's demonstrated major strengths (e.g., familiarity with the latest techniques in computational fluid dynamics; or "hands-on" capability in laboratory experimentation with sophisticated electronic equipment; etc.)?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Please characterize the personal contact between yourself and the fellow prior to the start of the summer program?  
\_\_\_No Contact                      \_\_\_Minimal Contact                      \_\_\_Substantial Contact
7. How effective was the fellow's contribution this summer?  
\_\_\_Not Very Effective                      \_\_\_Generally Satisfactory                      \_\_\_Excellent Progress
8. Please comment on the fellow's cooperativeness, diligence and interest:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. In what way(s) do you believe that the summer program has increased the fellow's competence and research potential?

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10. How has your interaction with the fellow been of benefit to your technical skills and progress?

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11. Would it be of value if the fellow were able to bring a graduate research student to join in the technical program?

☐ Not Very      ☐ Somewhat      ☐ Very      ☐ No Opinion

12. By the end of the second summer's fellowship, will the research results be written up as a manuscript for submission to a major archival journal?

☐ Yes      ☐ Probably      ☐ Doubtful

If yes, to which journal(s) will the manuscript be sent?

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13. In addition, or alternately, will the fellow and/or yourself present a paper at a major technical society meeting or symposium in your field?

☐ Yes      ☐ Probably      ☐ Doubtful

A. Name of the technical society or symposium?

---

B. Do the proceedings of the above meeting constitute a recognized publication?

☐ Yes      ☐ No

14. As you know, the Summer Faculty Fellowship Program is intended as an overall enrichment experience. The main emphasis is on participation in some phase of aerospace research of interest to NASA-Ames/Dryden. Also included are activities relating Stanford's resources such as seminars, workshops and interaction with Stanford faculty.

Please indicate the nature of any overall benefit to NASA drawing from your collaboration with the fellow and your overall assessment of the program, with any specific recommendations for improvement.

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15. **For Colleague's of First Year Fellows:**

*(Your evaluation of the faculty member's performance is our key criterion for awarding a fellowship to continue their research for a second summer. Your candid comments will be appreciated and will be held in confidence).*

- A. What influenced your selection of this particular faculty fellow (check all that apply):

☐ Previous knowledge of his/her work or reputation.

☐ Conversations (phone or in-person) with the fellow.

☐ Review of the fellow's application file.

☐ Other (please specify) \_\_\_\_\_

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- B. Are you interested in serving as the research advisor/NASA colleague for this fellow again next summer? ☐ Yes ☐ No

If not, why? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

16. For Colleague's of Second Year Fellows:

- A. Did you maintain personal contact with the fellow during the past academic year? ☐ Yes ☐ No

If yes, to what extent? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- B. Are there plans for future follow-up work with this fellow at his home institution via grant, contract, or other arrangement?

☐ Yes ☐ No

If yes, what is anticipated? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- C. Are you interested in serving as the research advisor/NASA colleague of a new fellow in the future? ☐ Yes ☐ No

If not, why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank you for your input.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

7/17/96

# 1996 NASA-ASEE-Stanford Summer Faculty Fellowship Program

## Ames Research Center Fellows' Calendar

|   |  |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
|---|--|------------------|--|---------------|--|---------------|------------------------------------|---------------|------------------------|------------------|---|-------------|--|
| <b>Special Seminars</b>   | <p>Seminars on New Science and Technology in the Aerospace Age; Terman Auditorium, Stanford University; Thursdays, 8:00 p.m.; June 27, July 11, 18, 25, August 1 and 8. These lectures are open to the public and family members are welcome to attend. The guest speaker schedule is enclosed</p> <p>Seminars on Current Research in the Aerospace Sciences; Bldg. 233, Rm. 172, NASA Ames Research Center; Tuesdays, 12:00 noon - 1:00 p.m.; June 18, July 2, 16, 23 and 30.<br/> Note: On July 9 the Stanford Linear Accelerator Tour will be held in lieu of the seminar. NASA colleagues and co-workers are welcome to attend. The guest speaker schedule is enclosed.</p>  |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| <b>Monday, June 10th<br/>Orientation</b>  | Fellows' orientation meeting from 8:30 - 10:00 a.m.<br>Bldg. 233, Room 172.  |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| <b>Thursday, June 13th<br/>Ames Research Center<br/>Tour</b>                    | <p>Family members are welcome (please call Melinda by 5:00 p.m. on 6/11 so visitor badges can be arranged). All fellows will meet in the Ames Cafeteria at 8:30 a.m. (Bldg. N-235 at the intersection of Durand and King Rd.). Map is enclosed.</p> <p>We will visit the following facilities:</p> <table> <tr> <td>9:00 - 9:45 a.m.</td><td>Numerical Aerodynamic Simulation (NAS) Facility Tour<br/>(Bldg. N-258) <i>Chris Gong &amp; Gina Morello</i></td></tr> <tr> <td>10:30 - 11:30</td><td>80 -By 120-Foot Wind Tunnel Tour<br/>(Bldg. N-221B) <i>Jim Barnes</i></td></tr> <tr> <td>11:30 - 11:45</td><td>Group Photo (near the wind tunnel)</td></tr> <tr> <td>11:45 - 12:45</td><td>Lunch (Ames Cafeteria)</td></tr> <tr> <td>1:00 - 1:45 p.m.</td><td>Life Sciences Facilities Tour<br/>(Bldg. N-239) <i>David Tomko</i></td></tr> <tr> <td>2:00 - 3:45</td><td>12-Foot Wind Tunnel Tour<br/>(Bldg. N-206) <i>Mike Harper</i></td></tr> </table> | 9:00 - 9:45 a.m. | Numerical Aerodynamic Simulation (NAS) Facility Tour<br>(Bldg. N-258) <i>Chris Gong &amp; Gina Morello</i> | 10:30 - 11:30 | 80 -By 120-Foot Wind Tunnel Tour<br>(Bldg. N-221B) <i>Jim Barnes</i> | 11:30 - 11:45 | Group Photo (near the wind tunnel) | 11:45 - 12:45 | Lunch (Ames Cafeteria) | 1:00 - 1:45 p.m. | Life Sciences Facilities Tour<br>(Bldg. N-239) <i>David Tomko</i> | 2:00 - 3:45 | 12-Foot Wind Tunnel Tour<br>(Bldg. N-206) <i>Mike Harper</i> |
| 9:00 - 9:45 a.m.  | Numerical Aerodynamic Simulation (NAS) Facility Tour<br>(Bldg. N-258) <i>Chris Gong &amp; Gina Morello</i>   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| 10:30 - 11:30   | 80 -By 120-Foot Wind Tunnel Tour<br>(Bldg. N-221B) <i>Jim Barnes</i>   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| 11:30 - 11:45   | Group Photo (near the wind tunnel)   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| 11:45 - 12:45   | Lunch (Ames Cafeteria)   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| 1:00 - 1:45 p.m.  | Life Sciences Facilities Tour<br>(Bldg. N-239) <i>David Tomko</i>  |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| 2:00 - 3:45   | 12-Foot Wind Tunnel Tour<br>(Bldg. N-206) <i>Mike Harper</i>   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| <b>June 18, July 2 &amp; July 9<br/>Dryden Flight Research<br/>Center Tours</b> | Ames fellows will visit Dryden with Bob Stambovsky as their tour guide. Please sign-up with Melinda if you would like to join one of these tours. Space is very limited.   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| <b>Sun. - Tues., June 23-25<br/>Asilomar Workshop<br/>Retreat</b>               | Registration from 3:00 - 4:15 P.M. on Sunday, June 23. Asilomar Conference Center, 800 Asilomar Blvd., Pacific Grove. Schedule and map enclosed.   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |
| <b>Thursday, July 4th</b>   | Independence Day Holiday   |                  |  |               |  |               |                                    |               |                        |                  |   |             |  |

- Tuesday, July 9th** Stanford Linear Accelerator Center Tour, 1:00 - 3:00 p.m.  
Meet at the Space Shuttle Model outside the Ames Visitor Center (Bldg. N-223) at 12:20 p.m. to arrange carpools (parking is very limited). We will leave for SLAC at 12:30. Family members are welcome. Map is enclosed.
- Friday, July 19th** Research review titles are due for all ASEE fellows.
- Saturday, July 20th**  
**Symphony Social** San Francisco Symphony's Midsummer Mozart Festival comes to Stanford's Frost Amphitheater for its "Napoleonic Campaign and End of Season Laser Light Show." 7:30 p.m. (gates open at 6:00 p.m. for picnicking). Performing Beethoven's Symphony No. 3 in Eb, Op. 55 Eroica; Weber's Konzertstück in f, J/282/Op. 70; and Tchaikovsky's 1812 Overture. Special group rate tickets \$17.00 (regular price is \$23.00) available until July 2nd. Tickets are for lawn seating-low beach chairs are O.K. to bring in. Limited chair seating is available for \$20.00 (group rate). Call Melinda if interested.
- Thursday, August 8th**  
**Friday, August 9th**  
**Research Reviews** All ASEE fellows are expected to attend the research reviews. A request for the title of your presentation is enclosed. A schedule will be distributed by the end of July.
- Thursday, August 8th** End of summer luncheon. Details to follow.
- Friday, August 16th \*** **Final Research Summary Report Due.**  
(Three pages maximum, including references and figures). See example enclosed.
- ASEE Evaluation of Program Due.**  
Form to be completed by fellows (will be mailed to you in late July).
- Colleague's Evaluation of Performance & Program Due.**  
(The form will be mailed to you in late July along with your ASEE evaluation. Please give it to your colleague for him/her to complete and return to Meredith, MS 241-3).

**\* Note:** In order to receive a final summer stipend payment the research summary report and both evaluations must be turned in.

**NASA-ASEE-Stanford  
Summer Faculty Fellowship Program Staff**

|                             |   |
|-----------------------------|---|
| Stanford University         | Michael E. Tauber Co-Director (415) 604-6086 / 723-5122<br>Ms. Melinda Francis, Program Admin. (415) 723-3328 |
| Ames Research Center        | Ms. Sylvia Stanley, Co-Director (415) 604-5623<br>Ms. Meredith Moore, Prog. Tech. Monitor (415) 604-5624      |
| Dryden Flight Research Ctr. | Mr. Donald Black, Dryden Program Mgr. (805) 258-3927<br>Ms. Kristie Carlson, Program Assistant (805) 258-2346 |

# NASA-ASEE-STANFORD AMES/DRYDEN SUMMER FACULTY RESEARCH PROGRAM

## 1996 FELLOWS

| NAME                              | POSITION & INSTITUTION  | SPECIAL FIELD OF INTEREST AND RESEARCH  |
|-----------------------------------|---|---|
| Babich, Michael                   | Asst. Prof., Biomedical Sciences, Univ. of Illinois<br>College of Medicine. Rockford, IL.   | Bone resorption and formation; study effects of hypergravity (centrifugation) on key cytoskeletal protein functions in cultured osteoblasts and subsequent effects on signaling, morphology, and proliferation.<br>Ph.D., Pharmacology, 1987. |
| Ballester, Jorge L.<br>(Hispanic) | Asst. Prof., Physics, Emporia State University.<br>Emporia, KS.                             | Theoretical astrophysics: interstellar clouds, dust & small grains, physical properties of polycyclic aromatic hydrocarbons (PAHs) and their astrophysical consequences, theoretical condensed matter physics, optics.<br>Ph.D., Physics.     |
| Bieniek, Ronald J.                | Assoc. Prof., Physics, University of Missouri-Rolla. Rolla, MO.                             | Atmospheric chemistry, atmospheric physics, earth and planetary atmospheres, lab astrophysics, atomic & molecular collision theory.<br>Ph.D., Physics, 1975.<br>(SFFP: Langley, 1986)   |
| Biezad, Daniel J.                 | Professor, Aeronautical Engineering, California Poly State University. San Luis Obispo, CA. | Flight systems simulation, guidance and control.<br>Ph.D., Aeronautical Engineering.<br>(SFFP: Dryden, '87 & '90)<br><b>DRYDEN</b>  |
| Blaisdell, Gregory A.             | Asst. Prof., Aeronautics & Astronautics, Purdue University. West Lafayette, IN.             | Aerophysics, fluid dynamics, turbulence physics, simulation, and modeling.<br>Ph.D., Mechanical Engineering, 1991.  |
| Boda, Wanda L.<br>(Female)        | Asst. Prof., Kinesiology, Sonoma State University.<br>Rohnert Park, CA.                     | Biomechanics, analysis of exercise in LBNP to simulate artificial gravity, biomechanics of gait in simulated gravity and in relation to athletic activities.<br>Ph.D., Biomechanics.  |

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|--------------------------------|--|---|
| Brawley, Stephen C.            | Lecturer, Aeronautics & Astronautics, Naval Postgraduate School. Monterey, CA.                   | Aerodynamic design using computational theory, numerical aerodynamic simulation, parallel computing, solid mechanics, control theory, experimental aerodynamics.<br>Ph.D., Aeronautical & Astronautical Engineering.                              |
| Chong, Delano P.<br>(Asian)    | Professor, Chemistry, University of British Columbia. Vancouver, B.C.                            | Application of computational quantum chemistry to problems in thermal protection systems.<br>Ph.D., Chemistry<br>(SFFP: Ames, 1988 & 1989)  |
| Compton, Debora A.<br>(Female) | Asst. Prof., Aerospace & Mechanical Engineering, Boston University. Boston, MA.                  | Experimental fluid mechanics, turbulent boundary layers (TBL's) & 3-D TBL's, instrumentation techniques: LDA, shear stress measurement, PIV, acoustics measurements.<br>Ph.D., Mechanical Engineering.  |
| Crepeau, John C.               | Asst. Prof., Mechanical Engineering, University of Idaho. Idaho Falls, ID.                       | Modelling the transition to turbulence, fluid mechanics, heat transfer, thermodynamics.<br>Ph.D., Mechanical Engineering.<br>(Assoc. West. Univ. SFF: Argonne National Lab, '95)  |
| Donohue, James M.              | Asst. Prof., Mechanical Engineering, Santa Clara University. Santa Clara, CA.                    | Optical diagnostics in high speed/high enthalpy flows, magnetohydrodynamics (MHD), arc jet characterization using laser diagnostics, shock waves, fluid dynamics, heat transfer and thermodynamics.<br>Ph.D., Mechanical & Aerospace Engineering. |
| Ewert, Daniel L.               | Asst. Prof., Electrical Engineering, North Dakota State University. Fargo, ND.                   | Gravitational physiology and flight equipment engineering, biomedical instrumentation, and gravitational cardiovascular research.<br>Ph.D., Physiology, 1989.   |
| Ganapol, Barry D.              | Professor, Hydrology/Water Resources & Aerospace/Mech. Engr., University of Arizona. Tucson, AZ. | Particle transport theory, reactor physics, application of radiative transfer to satellite remote sensing, satellite remote sensing of plant canopies, applied mathematics.<br>Ph.D., Engineering Science,  |
| Ghosh, Amitabha<br>(Asian)     | Assoc. Prof., Mechanical Engineering, Rochester Institute of Technology. Rochester, NY.          | Aerophysics: Applied aerodynamics, computational aerosciences, numerical aerodynamic simulation systems, flow diagnostics, CFD.<br>Ph.D., General Engineering Composite, 1980<br>(Army SFRP @ WES: '91, '92, '93; Navy SFRP @ NUSC: '89)          |

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|---|--|---|
| Hallbeck, M. Susan<br><b>(Female)</b>       | Asst. Prof., Industrial & Management Systems Engineering, University of Nebraska-Lincoln. Lincoln, NE. | Ergonomics (especially hand ergonomics & glove research); EVA gloves and tools; effect of pressure differentials, glove design, task, tools, body/hand posture and gender on strengt range-of-motion, dexterity, endurance and accuracy. Ph.D., Industrial Engineering, 1990. |
| Jackson, Catherine G.R.<br><b>(Female)</b>  | Professor, Kinesiology & Physical Education, University of Northern Colorado. Greeley, CO.             | Kinesiology, space life sciences: immunology, fluids & hydration, exercise in microgravity, countermeasures, exercise and cardiopulmonary physiology, nutrition. Ph.D., Exercise Physiology. (SFFP: NASA Ames '90 & '91)  |
| Johnson-Wint, Barbara P.<br><b>(Female)</b> | Assoc. Prof., Biological Sciences, Northern Illinois University. DeKalb, IL.                           | Gravitational biology: hypergravity facility for cell cultures, extracellular matrix: physical & enzymatic remodelling. Ph.D., Developmental Biology/Zoology (SFFP: Ames, '93 & '94)  |
| Kauser, Fazal B.<br><b>(Asian)</b>          | Professor, Engineering Technology/Aerospace Engineering, CA Polytechnic State University. Pomona, CA.  | Air breathing propulsion, applied aerodynamics, wind tunnel testing, hypersonic aerodynamics, propulsion and performance, flight dynamics. M.S., Aeronautical Engineering.<br><b>DRYDEN</b>   |
| Manor, David                                | Assoc. Prof., Aerospace Engineering, Parks College of St. Louis University. Cahokia, IL.               | Flight/wind tunnel testing, high ADA. Ph.D., Aeronautical Engineering, 1983.<br><b>DRYDEN</b>   |
| Marley, Mark, S.                            | Asst. Prof., Astronomy, New Mexico State University. Las Cruces, NM.                                   | Planetary sciences, atmospheres & interiors of giant planets and brown dwarfs, radiative-convective equilibrium atmosphere model, search for extra-solar planets. Ph.D., Planetary Sciences.  |
| Morris, Robert A.                           | Assoc. Prof., Computer Science, Florida Institute of Technology. Melbourne, FL.                        | Artificial intelligence, telescope automated scheduling, applications of logic in computer science - especially in knowledge representation, reasoning and decision procedures for knowledge domains. Ph.D., Philosophy, 1984. (SFFP: Johnson, 1990 & 1991.                   |

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|---|--|--|
| Miller, Richard H.                          | Assoc. Prof., Astronomy & Astrophysics,<br>University of Chicago. Chicago, IL.       | Astrophysics, dynamics of galaxies with supermassive black holes present, nuclear regions of galaxies, treecode program.<br>Ph.D., Physics.<br>(SFFP: Ames, '90 & '91)   |
| Nelson, Ronald K.                           | Assoc. Prof., Engineering, Arkansas Tech<br>University. Russellville, AR.            | Application of wavelet transform to flight test data, analyzing real and simulated flight test data using different transform kernels, signal processing, electromagnetics.<br>Ph.D., Electrical Engineering<br><b>DRYDEN</b>  |
| Nygren, Thomas                              | Assoc. Prof., Psychology, Ohio State University.<br>Columbus, OH.                    | Human factors; flight management; Workload assessment; workload and dynamic decision making; stress, affect and decision making; situation awareness.<br>Ph.D., Psychology, 1975.<br>(SFFP: Langley, 1991 & 1992).   |
| Ruffin, Stephen M.<br>(African American)    | Asst. Prof., Aerospace Engineering, Georgia<br>Institute of Technology. Atlanta, GA. | Heat transfer to high speed vehicles, airframe propulsion integration, high temperature gas dynamics, CFD applications to flow fields, 3-D Navier-Stokes.<br>Ph.D., Aeronautics & Astronautics.  |
| Sinha, Ravi P.<br>(Asian)(HBCU Institution) | Professor, Geology, Elizabeth City State<br>University. Elizabeth City, NC.          | Remote sensing (spectral signatures) in areas of tropical and temperate forests, air-sea and air-land interactions with emphasis on environmental impacts, climactic variations,<br>Ph.D., Geology.<br>(DOE: Oakridge, '79)  |
| Stone, Bradley M.                           | Assoc. Prof., Chemistry, San Jose State<br>University. San Jose, CA.                 | Spectroscopy of polyaromatic hydrocarbons, photochemistry in outer planet atmospheres, exobiology, aerosol formation in Titan's stratosphere.<br>Ph.D., Chemical Physics, 1984.<br>(SFFP: Ames 1989 & 1990).   |
| Szydluk, Paul P.                            | Professor, Physics, State University of New York<br>at Plattsburgh. Plattsburgh, NY. | Carbonaceous meteorites and interplanetary dust, organic cosmochemical evolution, cosmic dust and detection of biogenic elements, reentry heating of micrometeorites.<br>Ph.D., Physics.<br>(SFFP: JPL, '92 & '93, Lewis, '89 & '90; ONR: Naval Oceans Systems Ctr., '89 & '90; Air Force: Wright-Patterson, '83 ) |

Tipping, Richard H.

Professor, Physics & Astronomy, University of  
Alabama. Tuscaloosa, AL.

Planetary atmospheres, radiative transfers, spectral line  
shapes, molecular spectroscopy, pressure-induced spectra in  
gases and solids, atmospheric applications of molecular  
spectroscopy, perturbation theory and recurrence relations.  
Ph.D., Physics.  
(SFFP: Ames, '92, '93, '87, '86, '81 & '80;  
Langley, '94 & '95)

Wilson, H. William

Professor, Chemistry/Scientific Services,  
Western Washington University. Bellingham, WA.

Stratospheric trace gas measurements and the determination  
of laboratory baseline data for use in interpreting  
measurements (specifically nitrous oxide, carbon monoxide  
carbonyl sulfide), TDL spectroscopy.  
Ph.D., Physical Chemistry, 1960.  
(SFFP: Ames, 1981, 1982, 1990 & 1992)

Wolinsky, Ira

Professor, Human Development, University of  
Houston. Houston, TX.

Nutritional chemistry of bone and calcium, fluoride and bone,  
differential adaptive species response to low calcium intakes,  
mechanical strength of bone, immobilization and bone loss.  
Ph.D., Biochemistry, 1968.  
(SFFP: Ames, 1991 & 1992 and Johnson, 1985 & 1986.

Yeh, Hsien-Yang  
(Asian)

Professor, Mechanical Engineering, California  
State University, Long Beach. Long Beach, CA.

Aerostructures, thermostructures, failure of composite  
materials, fracture mechanics, solid mechanics.  
Ph.D., Composite Materials.  
(SFFP/USAF: Dryden, Lewis & JPL, 1987-1991)

**DRYDEN**